

ACADEMIC LEARNING TIME IN PHYSICAL EDUCATION IN GHANA - A  
DESCRIPTIVE ANALYTIC STUDY

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## Abstract

The purpose of this study was to utilize the Academic Learning Time-Physical Education (ALT-PE) observational instrument to describe the ALT-PE patterns of students in physical education classes. The Academic Learning Time - Physical Education ( ALT-PE) Version 2 with slight modification was used for data collection. Five graduate students served as observers/coders.

Eleven undergraduate preservice teachers from the University College of Education of Winneba, Ghana and their Junior Secondary School students were the subjects for the study. In all, 60 lessons were observed using 160 target students. Data collected were treated using percentages and mean scores.

The results of this study indicate that the overall ALT-PE accrued by the students was 20% , and ALT-PE was moderately higher for male student teachers than female student teachers. There was difference in ALT-PE scores between boys and girls. Low-skilled students accrued less ALT-PE than medium-skilled and high-skilled students. A great deal of time was spent in transitions ( 19%), waiting (19%), and warm-up (14.7%).

## CHAPTER 1

### INTRODUCTION

Physical education forms an integral part of general education, and it is unique in the educational process because it is the only aspect of education that is primarily concerned with the body and the development of attitudes and abilities that will give the individual the desire to be physically active throughout life ( Frost, Lockhart, and Marshall, 1995 ).

In Ghana, physical education forms part of the teacher training curriculum. It is, in fact, a core subject. At the tertiary level physical education is offered as an area of specialization leading to Diploma, Bachelor's, and Master's degrees. Physical education is also accepted as an instructional subject for both First and Second cycle schools in Ghana.

The teacher education process has two levels, namely preservice and inservice. The pre-service involves all the experiences that individuals go through preparing them to enter the teaching career and inservice refers to the continual education of teachers after they are certified for teaching and employed in a professional position. As part of the teacher preparation program in physical education, student teachers of the University College of Education of Winneba are required to do student teaching either in the primary, junior or senior secondary schools.

The question has been asked often, " What do teachers do in physical education?" How much time do they spend at each of their chores?" The answer to this pertinent question has resulted in several studies in Academic Learning Time - Physical Education ( ALT- PE ).

ALT-PE is a systematic approach for studying teacher effectiveness and student participation patterns in the gymnasium or on the playing field ( Siedentop, Birdwell and

Metzler, 1979 ). ALT-PE " is defined as the amount of time a student spends in class activity engaged in relevant overt motor responding at a high success rate" ( Metzler, 1982, p.49). ALT-PE observation instruments are used to collect information about student time-on task, following the assumption that improvement in this variable should be related to improving student achievement in the cognitive, psychomotor and affective domains. The ALT-PE instrument was used in several initial studies and was found to be appropriate for collecting data on student behavior in physical education ( Birdwell, 1980 ; Metzler, 1979; Placek, Silverman, Shute, Dodds and Rife, 1982 ). Some correlational evidence exists on the positive relationship between ALT-PE accrual and student learning ( Metzler, 1989 ).

ALT-PE research studies have been conducted mainly in the US, Canada, and Belgium and in a variety of settings (Dodds & Rife,1983). The results of ALT-PE studies aimed at investigating physical education classes done outside the US showed some similarities and also a number of peculiarities when compared to the research conducted within the US (Tousignant, Brunelle, Pieron, & Dhillon,1983). Even though physical education may be cultural universal, differences exist in the way it is organized and taught from culture to culture. The methods and techniques of teaching physical education in Ghana may vary from that of other countries. It is therefore relevant to embark on an ALT-PE study of this kind from a different cultural context.

Although the notion of ALT-PE is widespread among physical educators interested in teaching research in the US yet the concept of ALT-PE is very new to physical educators in Ghana. Not much work has been done in the area of ALT-PE in our schools even though ALT-PE provides a useful variable for studying teacher effectiveness in physical education.

The establishment of the collaborative program between the State University of New York, College at Brockport and the University College of Education of Winneba, Ghana in 1996 was a step in the right direction. This gave birth to a Master's program at the Department of Health, Physical Education, Recreation and Sports having a research focus to unearth the realities of teaching physical education in Ghana and to build a knowledge base for teaching in physical education. Parker and O'Sullivan (1983) noted that ALT-PE studies have been done almost exclusively with experienced teachers as distinct from preservice teachers.

The significance of the study is to contribute knowledge about how ALT -PE instrument could be used to provide proper feedback to preservice teachers. Proper data-based feedback given to preservice teachers will convince the student teachers that the results are representative of actual performance (specific information) and can be used to set specific goals for teaching skill improvement. Furthermore, the findings of this study will strengthen the professional preparation of physical educators at the undergraduate level and contribute to the knowledge in teaching physical education in Ghana.

#### STATEMENT OF THE PROBLEM

No study has been attempted to determine ALT-PE accrual of preservice teachers in physical education classes in Ghana.

The purpose of the study was to utilize the ALT-PE observational instrument to describe the ALT-PE patterns of students in physical education classes taught by pre-service teachers.

The ALT-PE descriptive data were gathered to answer the following questions:

1. What are the overall ALT-PE patterns for all students in the Junior Secondary

School physical education class?

2. In what respects do student ALT-PE patterns show differences for girls and boys?

Research studies show that boys hold more favorable attitudes than girls toward physical education and games ( Haladyna & Thomas, 1979; Australian Sports Commission, 1991).

3. In what respects do students ALT-PE patterns show differences for male and female teachers?

4. In what respects do students ALT-PE patterns show differences for high, medium and low skill levels.

#### ASSUMPTIONS

1. Both students and teachers behaviors demonstrated were observable and measurable.

2. The presence of the observers during class time did not influence the behavior of the teachers and students.

3. The interval recording technique of the ALT-PE instrument provided a representative sampling of behavior which would have been obtained from continuous observation.

4. The audio-cassette recorders were not distractive and did not affect teachers and student behaviors during class observations.

5. The classes and teachers observed were a representative sample of other classes in the school district.

6. The ALT-PE instrument provided valid and accurate information regarding the learning environment of various physical education and the respective students.

## DELIMITATIONS

The study was limited to 11 undergraduate preservice teachers (6 males and 5 females) of the University College of Education, Winneba doing their student teaching in selected Junior Secondary School in Winneba.

The Junior Secondary Schools were selected based on convenience and accessibility.

## LIMITATIONS

1. A limitation of the current study was that the preservice teachers classified the students into high-skilled, medium-skilled, and low-skilled levels within one week.
2. Lessons were taught with inadequate equipment and facilities.
3. The size of the classes was too large.

## DEFINITION OF TERMS

Academic Learning Time - Physical Education (ALT-PE): A unit of time in which a student is engaged in relevant physical education content and achieves an 80 percent probability of being successful with regard to the task of the lesson ( Siedentop, 1983)

Not Motor Engaged: All involvement other than motor involvement with subject matter oriented motor activities ( Siedentop, Tousignant & Parker, 1982).

Motor Engaged: Motor involvement with subject matter oriented motor activities ( Siedentop, Tousignant & Parker, 1982).

Interval Recording: An observational technique which refers to the observation of behavior for short periods of time (intervals) and deciding what behavior best characterizes that time period ( Siedentop, 1983).

Inappropriate Unsuccessful (IU): Student engagement in a subject matter motor activity, but

the activity is performed with the wrong technique and without success.

Inappropriate Successful (IS): Student engagement in a subject matter motor activity, but the activity is performed with the wrong technique with success.

Appropriate Unsuccessful (AU) : Student engagement in a subject matter oriented activity using the correct technique but without success.

Preservice Teachers: In Ghana, teacher certification has three levels; Teachers' Certificate "A", Teachers' Diploma, and Degree. Each of this level requires a minimum of 3 years of professional preparation with at least 2 years of practical experience at a particular level to upgrade. Are individuals who are being prepared for entry into a teaching career. These may be individuals who have never been certified and employed as teachers in a professional position or who, after having been certified and employed as teachers are back in college to upgrade for a higher qualification.

Inservice Teachers : Teachers who are already certified and are employed in a professional position.

Student Teaching: Major practicum in the teacher training process. It occurs near program completion and conducted in a field site with actual clients and at least some full-time responsibility for teaching.

First and Second Cycle Schools: Synonym used in Ghana for primary and secondary schools respectively.

### Summary

This chapter states the importance of physical education in the school curriculum in Ghana and provides brief background information of the study in relation to relevance of conducting a cross-cultural study using the ALT-PE construct, including the statement of the problem. It also lists six assumptions, and states the limitations and delimitations of the study. The chapter also includes operational definition of terms.

## CHAPTER II

### REVIEW OF LITERATURE

Many ALT-PE studies have been done to date, except that most was almost exclusively with experienced teachers and not preservice teachers. The review of literature has been broken down into three sub-sections, (1) the history of Academic Learning Time as a measure of student learning, (2) early ALT-PE efforts and studies, (3) limitations of ALT-PE system, and (4) research on effective teaching.

#### The History of Academic Learning Time as a Measure of Student Learning

Lee and Poto (1988) noted that the study of instructional time in classrooms and in physical education has a long, impressive research history with several modifications along the way. Doyle (1978) shares the view that the influence of teaching on student learning is indirect. Teacher behavior affects student behavior, and student behavior is directly related to achievement. This has been the key concept of the model of time and learning.

Carroll (1963) was the first to propose a model for school learning in which many of the basic concepts could be measured. His model formed the basis for Bloom's (1974) work on mastery learning. Bloom (1974) was of the view that for students to be made achievers, there is the need for teachers to provide time, help and motivation. Not all researchers agree with the fact that time was a necessary ingredient for learning. Wiley and Harnischfeger (1974) suggested that the passage of time or the mere quantity of schooling was valuable, and it did not matter how that time was utilized.

During the late 1970s many classroom and physical education researchers focused on student-engaged time as a measure of learning ( Lee & Poto, 1988) . Other models of

classroom research existed during the same time with Carroll's (1963). There was the criterion-effectiveness paradigm which was the dominant model in teaching. Also, in existence was the Process - Product research design which was an improvement over criterion of effectiveness designs in that teaching activities were directly observed and measured using formal, quantitative observation systems. The focus was on teacher behavior variables that would correlate with student achievement test scores. According to Lee and Poto (1988) some of the observation systems included student behaviors, but student-engaged time was generally not one of the variables studied.

Student-engaged time therefore emerged as a quantitative measure of student cognitive processes leading to learning from a modified process-product design.

In the early 1970s the National Institute of Education funded the Beginning Teacher Evaluation Study (BTES), which was administered by the California Commission for Teacher Preparation and Licensing and conducted primarily by the Far West Laboratory for Educational Research Development. The investigators decided that student contact with appropriate curricular materials would lie at the center of their research focus (Berliner, 1979). Three measures of instructional time were developed as central to the BTES project: allocated time, engaged time, and Academic Learning Time. Allocated Time is the time a teacher allocates for instruction and practice in a particular subject matter area. Engaged time is the portion of allocated time that a student is actually involved with the subject matter. Academic Learning Time (ALT) is that portion of engaged time when the student is involved with materials that are appropriate to his/her abilities resulting in a high success rate and low error rate.

The difference between ALT model and the other process-product paradigms in teacher effectiveness studies is that it did not link teacher activities directly to achievement, rather student activity, in the form of ALT, stood between the teacher's activities and the subsequent student achievement. The model is like this:

Teacher Practices and Context factors -----> ALT---> Student Achievement in that content area.

In the reading and math curricula covered in the BTES (Second & Fifth grades), ALT did prove to be a significant predictor of student achievement ( Fisher et al.,1981).

#### Early ALT-PE efforts and studies.

The concept of ALT-PE was born at the annual meeting of the American Educational Research Association in Toronto in 1978 where several BTES papers were presented. Siedentop, Birdwell, & Metzler (1979) adapted the ALT model and presented a series of papers explaining how the ALT-PE concept could be used as a process measure in physical education. Researchers from Ohio State conducted different studies using the ALT-PE system. Metzler (1980) completed the first ALT-PE study, a descriptive study of physical education teachers using the ALT-PE system. Rate (1981) then conducted a similar study focusing on interscholastic athletic settings. Birdwell (1980) and Whaley (1980) followed with the first experimental studies utilizing ALT-PE as a criterion variable against which to evaluate changes in certain teachers' activities thought to be closely linked to levels of ALT-PE in physical education classes. The original ALT-PE coding instrument was revised and simplified by Siedentop, Tousignant, and Parker (1982).

Supporting evidence for Academic Learning Time comes from both large, well-

conducted studies in classroom research (Berliner & Rosenshine, 1978; Brophy, 1979; MacDonald & Elias, 1976) and research conducted in physical education as cited by Rink (1993).

ALT-PE ( Siedentop, Tousignant, & Parker, 1982) is both robust and utilitarian (Hawkins, Wiegand & Bahneman, 1983). The ALT, the time-on-task concept is utilized to examine relationship between what teachers do and the amount of time student spend on specific learning task ( Shute et al.,1982). Silverman, Denvillier & Ramirez (1991) have reported that the instrument, both version 1 and version 2 have been extensively used to collect data for many studies (Auferheide, Olson, & Templin, 1981; Costello & Lawbook, 1978; Godbout, Burnelle,& Tousignant, 1983; Metzler, 1980; Placek, Silverman, Shute, Dodds, & Rife, 1982; Silverman, Dodds, Placek, Shute, & Rife, 1984).

Hawkins, Wiegand & Bahneman (1983) of the University of West Virginia adapted an ALT system to assist in monitoring teachers in training. In developing the system each method was designed to progress through three phases: (a) a laboratory phase, (b) a micro-teaching phase, and (c) a field experience phase. ALT-PE was selected as the student criterion process variable. Two considerations were used in selecting ALT-PE. First, the category of " motor appropriate" was used by the system. Second, the ALT-PE system generated data by observing individual students. Two major modifications were made in the ALT-PE system. The evaluation designers did not make context level decision and electronic data processors were used in lieu of interval recording. This allowed for large data collection capacity. ALT-PE was found to be congruent with the conceptual goals of the department and therefore was established as a key dependent variable standing in judgement over the degree of success

in the program at the University of Virginia.

Godbout, Brunelle, & Tousignant (1983) conducted a study to determine how much ALT is experienced by elementary and secondary students during physical education physical classes and to investigate major ALT variables: time devoted to specific content areas, learner engaged time with relevant material and student success rate. Sixty-one subjects were involved in the study. These were physical education teachers of both gender working at the elementary or at the secondary level. Approximately two months after the first observation a second was scheduled. The purpose of the observational procedures was to determine which amount of time was devoted to each category. The results showed that the determination of the percentage of academic learning time offered to students in elementary and secondary school physical education classes proved to be a worthwhile endeavor. The ALT-PE system was found reliable and relatively easy to use. The main difference found between the elementary and secondary level was the amount of physical education content as against general content activities. The impression was that there was less time lost, at the secondary level, in waiting, managing and resting, and that this time available was used to increase the competition time in the classroom.

Silverman et al.(1984) examined the difference in ALT-PE subcategories of engaged in motor or cognitive activity, engaged in motor practice, and engaged in motor practice at an easy difficulty level for two different instructional situations, for different activity units, and for student characteristics of sex, skill level, and special-needs status.

Subjects were two large groups of elementary students in two schools with different teachers. Group 1 was under the inexperienced teacher whose unit of study was movement education.

Group 2 under the experienced teacher with sports and games as the unit of study. The results related to activity unit showed much higher levels of ALT-PE for the movement education unit than that of the sports and game unit . The trend of the team sports showed the lowest levels of ALT-PE in each of the categories. The overall result showed that movement education for elementary students seemed to increase their engaged time in motor and cognitive, motor practice and level of difficulty.

Randall and Inwold ( 1989) determined the effect of a training program on the amount of ALT-PE provided by student teachers. A treatment group/control group experimental design was used to test the effect of an intervention. Subjects were 13 student teachers who were completing their public school internships in physical education. Subjects in the treatment group were exposed to an intervention designed to enhance their awareness of the concept of ALT-PE through participation in a pre-internship seminar, implementation of modified planning materials, directed information feedback, and goal setting. Subjects in the control group received no specialized preparation prior to the internship other than standard course work. A total of 50 classes were observed. The descriptive analysis revealed that teachers in the treatment group produced more ALT-PE than teachers in the control group.

#### Limitations of Academic Learning Time in Physical Education (ALT-PE)

ALT-PE has suffered some criticisms from reviewers pointing to the need to establish a relationship between ALT variables and achievement. They argue that achievement scores are better measures of learning than ALT scores. Berliner (1979) as cited by Siedentop (1983) argued that ALT might be better measure of student learning than typical achievement measures and that ALT allows one to assess learning as it occurs rather than having to wait

until the end of a unit or school year.

Dodds, Rife, & Metzler (1982) recommended that ALT-PE be validated through correlation with achievement test scores. Not much work has been done with regard to this. Perhaps because there has been no large-scale research effort in physical education comparable to the BTES (Lee & Poto, 1988). Although ALT has correlated with student achievement in classroom research, the time measure in physical education has not shown similar predictive qualities. Lee and Poto (1988) noted that the correlations found in the BTES were not particularly strong to begin with even though they were statistically significant, so minor deviations in methodology could make the difference between significant findings in classroom research and non-significant findings in the physical education setting. They further suggested that if persons attempting to demonstrate a relationship between ALT-PE and student achievement test scores are to be successful, some standardization seems warranted in the areas of length of experimental teaching units (ETUs), statistical methods and type of behavior designated as ALT.

Metzler, DePaepe, & Reif (1985) pointed out that the ALT-PE coding system uses "generic" movement categories with no provision for noting content-specific engagement. These content -specific categories are extremely useful for determining just how much practice a student gets on a certain skill, as well as the rate of success within each skill. While admittedly reducing the ability to compare data across activities, using content -specific activity lists within an ALT-PE observation would greatly expand the usefulness of the data within a given research context.

Anderson (1983) noted that while increasing ALT-PE is normally a virtue, in some

contexts more ALT-PE may not be good. A clever student teacher could probably find a number of ways to insure high ALT-PE by avoiding responsible teaching. When the supervisor comes to code he will not teach anything new and he would choose the day's activities based, not on what the student's needed, but on what he knows would produce the highest ALT-PE scores.

### Research on effective teaching

Research on teacher effectiveness has helped to identify patterns of teacher behavior that are clearly effective in producing student achievement gains. One pattern of instruction has been referred to as "direct instruction" (Berliner, 1979, Brophy, 1979, Rosenshine, 1979) or "active teaching" (Good, 1979).

Metzler (1990) conceptualizes effective teaching as that which makes an impact on student learning. Effective teaching skills cannot be divorced from student learning which is measured as outcomes directly or by identifying situations likely to lead to increased learning. Evertson & Brophy (1978) define the effective teacher as one who finds ways to keep students appropriately engaged in the subject matter a high percentage of the time and does so without resorting to coercive, negative or punitive classroom technique.

In a recent study of teaching physical education in which over 100 lessons were evaluated, McLeish (1981) concluded that "It was one of the major impressions received in the use of the ALT-PE system that this supplies the missing element or indeed, the major component, for evaluating effective teaching in physical education. Time-on-task, academic learning time, opportunity to learn - call it what you will, and measure it if you can - this is the vital component of effective teaching in general" (p.31).

### Summary

The Academic Learning Time in Physical Education (ALT-PE) has a long, impressive research history. This chapter traces the history of ALT-PE with the several modifications along the way, and presents some descriptive-analytic studies done using the ALT-PE system. It also points out certain criticisms and limitations of the ALT-PE observational instrument by its users and highlights the effectiveness of the instrument in dealing with teacher effectiveness in physical education.

## CHAPTER III

### METHODS AND PROCEDURES

The purpose of this chapter is to present the methods and procedures used to describe the ALT-PE patterns accrued by students in physical education classes. This chapter has the following sections: (a) selection of subjects & settings, (b) observational procedures, (c) training procedures and observation, (d) academic learning time in physical education data collection, and (e) data analysis procedures.

#### Selection of Subjects and Settings

Subjects consisted of Junior Secondary School students ranging from JSS 1-3, and 11 undergraduate preservice teachers from the University College of Education of Winneba, Ghana ( 6 males & 5 females) who were doing their student teaching in physical education. Observations were conducted during each physical education lesson of 30 minutes duration. In all, 60 lessons were observed using 160 target students. The number of students in each class ranged from 16-50.

The teachers were given prior information to use the first week of teaching to classify the students into high-skilled, medium-skilled, and low-skilled groups according to their perception of how successfully the students perform generally in the P.E. class. Some students were observed once, others more than once depending on a randomized subject selection process.

The student teaching was scheduled to take place from 23rd June - 18th July, 1997. The posting of student teachers to their respective Primary and Junior Secondary Schools of practice in and outside Winneba was done by the Teaching Practice Committee. Lesson time-

tables of student teachers of physical education practicing in the Winneba school district were collected. Junior Secondary Schools within the radius of 2-3 kilometers from the university campus were selected based on convenience and proximity. Observations were programmed to follow the lesson time-table of the teachers. The preservice teachers were not restricted to a specific content or activity taught within physical education. A variety of lessons or activities were taught : volleyball, basketball, track and field and gymnastics.

#### Observation Procedures

On the observation day, teachers identified three students, one from each category of high-skilled, medium-skilled, and low-skilled groups as target students. Each student selected was identified by a strip of cloth of a particular color to depict his or her category.

Observation started when the teacher was present and gave his or her first instruction, and ended when the teacher dismissed the class.

Five observers were involved in this study. Each observer had an audio-cassette recorder which provided alternating verbal cues from a programmed audio tape at 5 seconds intervals during the observation sessions. The first 5 seconds is to "observe" and the second 5 seconds "record" on the coding sheet. Each observer watches three target students ( one - high-skilled, one - medium-skilled, and one- low-skilled ) in a sequence for an entire class period. The first row of intervals is for student A; the second row for student B. The third row for student C etc. After completing the rows for the three students the observer then moves to the 4th row which is now for student A and so forth. The actual coding moves down columns before moving across rows. The first observe - record interval focus on student A, the second on student B, the third on student C, the fourth on student A, and so on

(see Appendix B).

### Training Procedures and Observation

Five graduate students served as data collectors in this study. Two of them had already completed a course in Analysis of Teaching and Supervision of Student Teachers. The other two had also completed the same courses, and were in practice of the ALT-PE instrument. A four-day training session ( total of about 20 hours) was organized for the five graduate students to refresh their minds on the use of the system. During the training sessions, observers reviewed the coding manual, discussed the ALT-PE categories, viewed video tapes and then practiced coding from video tapes and live setting. The training sessions followed these steps:

Step 1 : Instruction, discussion and clarification of category labels and written definitions.

Step 2 : Introduction to and discussion of the Coding Sheet and procedures for observation.

Step 3 : Group development of actual examples to explain each category.

Step 4 : Practice with group verbal coding for a variety of video taped class lessons.

Step 5 : Individuals practice silent coding from video tapes and then compare their coded data (Inter Observer Agreement)

Step 6 : Group practice verbal coding in the live setting.

Step 7 : Individuals practice silent coding in the live setting and then compare their coded data (IOA)

Training continued until the coders or observers reached a criterion of .80 IOA or more.

The results of Interobserver Agreement (IOA) during the training sessions between two or

more coders are reported in Table 1.

Table 1. Interobserver Agreement ( IOA) for ALT-PE instrument categories

Day	1	2	3	4
% of IOA	72.8%-79.2%	80.9%-83.3%	84.7%-89.7%	92.2%-94.7%

There were also weekly reliability checks during the period of data collection to prevent observer drift. The Scored-Interval (S-I) method was used to calculate interobserver reliability ( Hawkins & Dotson, 1975). Inter Observer Agreement (IOA) was determined by percentage agreement ( $IOA = \frac{\text{Agreements}}{[\text{Agreements} + \text{Disagreements}]}$ ) for the context and learner involvement levels as well as for individual subcategories.

#### ALT-PE data collection

The ALT-PE system ( version 2, Siedentop, Tousignant & Parker, 1982 ) was used to collect all data. The instrument uses an interval recording system consisting of two levels of decision making (see Appendix B ). Interval recording uses a short, constant period of time during which it is determined if one or more target (defined) behaviors occurred for a part or all of the interval. A frequency count is then determined for how many intervals in which each behavior was coded during a session. The length of the interval is crucial to the validity and reliability of the collected data. If the interval is too long, multiple non exclusive behaviors might occur within the same interval. If the interval is too short, a behavior might not have an opportunity to be observed and then coded ( Metzler, DePaepe, & Reif, 1985). The first level is the context level, which shows how the teacher has structured the class. Coders or Observers decide the context of the instruction - General, Subject Matter Knowledge or Subject

Matter Motor by selecting the appropriate subcategory of one of the three context categories. Then, if students are in a Subject Matter Context, the coder selects a Learner Involvement level subcategory from the Not-Motor Engaged or the Motor Engaged categories showing what the observed student is doing within the class context.

Decision Log: A slight modification was made to the ALT-PE format to provide additional information. Three other subcategories were added to the category of Motor-Engaged; a) inappropriate unsuccessful, b) inappropriate successful, and c) appropriate unsuccessful. This was because in a physical education class student motor responses judged as appropriate or inappropriate, depending on technique or form, may either achieve or fail to achieve the goal of the drill. Where the goal of the drill is achieved, the student motor response is said to be “successful”, but where it fails to achieve the goal of the drill it is said to be “unsuccessful” ( Siedentop, 1991).

The demographic information portion of the sheet provides space to identify the teacher, date, school, activity, observer, allocated time, and other information that is important for any lesson ( see Appendix A).

Each of the levels is described in details as follows:

#### Level I (Context Level)

This level comprises three categories, namely the general content, subject matter knowledge content, and subject matter motor content. Each subdivision is explained below in addition to their respective subcomponents.

#### General Content Categories

These depict class times when students are not involved in physical education activities.

Transition (T) : Time devoted to managerial and organizational activities which relate to the instructional activity. For example, students move from station to station.

Management (M) : Time devoted to class business that is unrelated to instructional activity. For example, Teacher takes attendance while the students wait.

Break (B) : Time devoted to rest and / or discussion of issues unrelated to subject matter. For example, students ask permission to get a drink of water.

Warm-Up (WU) : Time devoted to routine execution of physical activities whose purpose is to prepare the individual for engaging in further activity, but not designed to alter the state of the individual on a long term basis. For example, students run freely in the gymnasium.

#### Subject Matter Knowledge Categories

These depict class time when the main emphasis is on knowledge related to physical education content.

Technique (TN): Time devoted to transmitting information concerning the physical form or topography of a motor skill. For example, students watch the teacher demonstrate the grip of the tennis racket.

Strategy (ST) : Time devoted to transmitting information concerning plans of action for performing individually or as a group. For example, students discuss how best to pass a soccer ball on a wet day.

Rules (R) : Time devoted to transmitting information about regulations that govern activity related to the subject matter. For example, students watch a video depicting the rules of volleyball.

Social Behavior (SB) : Time devoted to transmitting information about appropriate and

inappropriate ways of behaving within the context of the activity. For example, students listen explanation of sportsmanship.

Background (BK): Time devoted to transmitting information about a subject matter activity such as its history, rituals, heroes, heroines, records, importance in later life, or relationship to fitness. For example, students receive information on the history of soccer.

#### Subject Matter Motor Categories

This subdivision is in relation to class time when the primary focus is on motor involvement in physical education activities.

Skill Practice (P): Time devoted to practice of skills or chains of skills outside the applied context with the primary goal of skill development. For example, students practice dribbling in field hockey.

Scrimmage/Routine (S): Time devoted to refinement and extension of skills in an applied setting ( i.e., in a setting that is like or simulates the setting in which the skill is actually used) and during which there is frequent instruction and feedback for the participants. For example, five against five soccer game with frequent teacher suggestions and feedback.

Game(G): Time devoted to the application of skills in a game or competitive setting when the participants perform without intervention from the instructor or coach. For example, students run a 200 meter relay on the track.

Fitness(F) : Time devoted to activities whose purpose is to alter the physical state of the individual in terms of strength, cardiovascular endurance, or flexibility. For example, students complete a circuit training course of various fitness stations.

## Level II : ( Learner Involvement Level)

This level has 2 main subdivisions of Not Motor Engaged or Motor Engaged. There are five behavior categories under Not Motor Engaged and six under Motor Engaged.

### Not Motor Engaged Categories

These categories depict any student involvement other than motor involvement with subject matter-oriented motor activities.

Interim (I) : The student is engaged in a non-instructional aspect of an ongoing activity. For example, student is changing side of a court in a volleyball game.

Waiting(W) : Student has completed a task and is waiting for the next instructions or opportunity to respond. For example, student waits for his turn in a drill.

Off-task (OF) : The student is either not engaged in an activity he or she should be engaged in or is engaged in an activity other than the one he or she should be engaged in . For example, student is teasing a friend while the teacher instructing.

On-task(ON) : The student is appropriately involved in carrying out an assigned , non-subject-matter task ( e.g., management task, transition task, warm -up task).

Cognitive (C) : The student is appropriately involved in a cognitive task. For example, student is watching a demonstration of how to catch an aerial ball in soccer.

### Motor Engaged Categories

These categories has to do with motor involvement with subject matter-oriented motor activities related to the goals of the setting.

Motor Appropriate(MA) : The student is engaged in a subject matter motor activity in such a way as to produce a high degree of success. For example, the student shoots a basketball

which goes through the hoop.

Motor Inappropriate(MI) : The student is engaged in a subject matter-oriented activity, but the activity -task is either too difficult for the individual's capabilities or so easy that practicing it could not contribute to lesson goals. For example, student is unable to serve the ball over the net in a volleyball game.

Supporting (MS) : The student is engaged in subject matter motor activity whose purpose is to assist others in learning or performing the activity. For example, student tosses a volleyball so another student can practice the set.

Inappropriate Unsuccessful(IU) : The student is engaged in a subject matter motor activity, but the activity is performed with the wrong technique and without success. For example, trying to shoot on goal with the nonkicking foot pointing away from the direction of target.

Inappropriate Successful( IS) : The student is engaged in a subject matter motor activity, but the activity is performed with the wrong technique with success. For example, a student shoots a basketball which goes through the hoop with the wrong hold of the ball.

Appropriate Unsuccessful (AU) : The student is engaged in a subject matter oriented activity using the correct technique but without success. For example, a student spikes a volleyball into the net using the technique.

### Data Analysis Procedures

The nature of research described is a Descriptive-Analytic research. It seeks to obtain an objective and detailed description of selected teaching and learning interactions as they occur in their natural settings and to make analysis for the purpose of identifying patterns and associations.

The data from the ALT-PE coding sheets was summarized as a percentage of the total intervals which is an appropriate method for descriptive studies. Each single behavioral category was expressed as a percentage frequency of occurrence with this formula :

$$\text{Intervals Observed/Total Intervals} \times 100 = \% \text{ Occurrence}$$

Data on ALT-PE were calculated by only the " MA" intervals recorded at the learner involvement level. The total time spent in ALT-PE was determined by multiplying the percent of occurrence by the total duration of the observation period. The SPSS program was used to generate descriptive statistics on mean percentage and standard deviations.

#### Summary

The purpose of the study was to utilize the ALT-PE observational instrument to describe the ALT-PE patterns of students taught by preservice teachers in physical education classes. Subjects were Junior Secondary School students ranging from JSS 1-3 and 11 undergraduate preservice teachers who were doing their student teaching in physical education.

The Academic Learning Time in Physical Education ( ALT-PE) version 2 interval recording system with slight modification was used for data collection. The first step in analyzing the data was categorizing them into context and learner involvement levels, and then expressing each subcategory as a percentage frequency of occurrence. The SPSS program was used to generate statistics on mean percentages and standard deviations.

## CHAPTER IV

### RESULTS AND DISCUSSION

The purpose of this study was to utilize the ALT-PE observational instrument to describe the ALT-PE patterns of students taught by preservice teachers in physical education classes. Subjects were Junior Secondary School students ranging from JSS 1-3 and 11 undergraduate pre-service teachers doing student teaching.

The Academic Learning Time - Physical Education (ALT-PE) Version 2 interval recording system was used for data collection. The first step in analyzing the data was categorizing them into context and learner involvement levels, and then expressing each subcategory as a percentage frequency of occurrence.

This chapter consists of two sections, results and discussion. The results were presented under four subheadings: overall descriptive ALT-PE data, gender and ALT-PE data, teacher and ALT-PE data, and skill level and ALT-PE data in relation to the research questions. In all eight tables were used for presenting and discussing the results. The “ a & b” of each table represent the context and learner involvement levels respectively.

### RESULTS

#### Overall Descriptive ALT-PE Data

Table 2a. Overall ALT-PE in physical education classes investigated ( Context Level)

CONTEXT LEVEL	MEAN %	SD
<b>General Content</b>		
Transition	19	7.3
Management	0.2	1.4

Break	*	0.3
Warm-up	14.7	8
<b>Sub-total</b>	<b>33.9</b>	
<b>Subject Matter Knowledge</b>		
Technique	19.6	8.5
Strategy	*	0.7
Rules	*	0.2
Social Behavior	0.1	0.6
Background	*	0.4
<b>Sub-total</b>	<b>19.7</b>	
<b>Subject Matter Motor</b>		
Skill Practice	35.8	15.9
Scrimmage	0.8	2.7
Game	9.7	10.7
Fitness	*	0.4
<b>Sub-total</b>	<b>46.3</b>	
<b>Total</b>	<b>100</b>	

\* Denotes a value less than .1

Table 2a consists of all descriptive data totals for the context level. The various mean percentages represent the proportion of the entire class period devoted to any particular category of the ALT-PE model.

Table 2a shows that students spent 33.9% of their time on general content, 19.7% of their time on subject matter knowledge and 46.3% of class time on subject matter motor. The breakdown of the time spent in general content indicates that most part of the time was

allocated to transition, that is, time devoted to managerial and organizational activities related to instructional activity. Comparatively, very little time (0.2%) was spent in attending to business unrelated to instructional activity. It is significant to note that 14.7% of class time was devoted to preparing students for further activity (warm-up).

Of the total time allocated to subject matter knowledge virtually no time was made for strategy, rules, and background. The time was exclusively devoted to technique. That was 19.6% of the time. Very little time (0.1%) was spent on social behavior.

The highest percentage of class time was devoted to subject matter motor (46.3%). Out of this time, 35.8% was allocated to skill practice as opposed to scrimmage (0.8%) and game (9.7%).

Table 2b. Overall ALT-PE in physical education classes investigated ( Learner Involvement Level).

LEARNER INVOLVEMENT LEVEL	MEAN %	SD
<b>Not Motor Engaged</b>		
Interim	1.5	3.2
Waiting	19	12
Off-task	2.2	7.4
On-task	31.8	11.6
Cognitive	19.9	8.4
<b>Sub-total</b>	<b>74.4</b>	
<b>Motor Engaged</b>		
Motor Appropriate	20.1	14.1
Motor Inappropriate	3.3	5.7
Supporting	1.8	4.1
Inappropriate Unsuccessful	0.3	1.5
Inappropriate Successful	0.2	0.9
Appropriate Unsuccessful	*	0.6
<b>Sub-total</b>	<b>25.7</b>	
<b>Total</b>	<b>100</b>	

\* Denotes a value of less than .1.

Examination of time spent at the learner involvement level in Table 2b revealed that the observed students were not motor engaged 74.4% of the time. They spent 25.7% of class time actively engaged in motor activities. In the Not motor engaged categories, 1.5% of the time was spent on non-instructional aspect of an ongoing activity ( interim), 19% in waiting for

their turns to participate in motor activities and for 31.8% of the time students were on task. A great deal of time ( 19.9%) was spent listening to the teacher.

In the Motor engaged subcategories 20.1% of the observation time was spent doing motor activities with success and during 3.3% of the time students of the time students found activities either too easy or too difficult. For 0.2% of the time students responded successfully in an assigned activity using an inappropriate physical form.

### Gender and ALT-PE Data

Table 3a. Percent of observed intervals spent in ALT-PE categories for male (100) and female (80) students ( Context Level).

CONTEXT LEVEL	MALE STUDENTS		FEMALE STUDENTS	
	MEAN %	SD	MEAN %	SD
<b>General Content</b>				
Transition	19.3	7	18.7	7.7
Management	0.3	1.8	*	0.3
Break	*	0.4	0	0
Warm-up	14.8	7.6	14.6	8.5
<b>Sub-total</b>	<b>34.4</b>		<b>33.3</b>	
<b>Subject Matter</b>				
<b>Knowledge</b>				
Technique	19.2	8.5	8.5	8.6
Strategy	*	1	0	0
Rules	0	0	*	0.3
Social Behavior	0.1	0.6	0.1	0.6
Background	*	0.6	0	0
<b>Sub-total</b>	<b>19.3</b>		<b>8.5</b>	

Subject Matter				
<b>Motor</b>				
Skill Practice	35.8	16.3	35.8	15.5
Scrimmage	0.8	2.8	0.8	2.7
Game	9.8	10.8	9.5	10.7
Fitness	*	0.5	0	0
<b>Sub-total</b>	<b>46.4</b>		<b>46.1</b>	
<b>Total</b>	<b>100</b>		<b>100</b>	

\* Denotes a value less than .1.

Table 3a shows the overall percentages of observed intervals devoted to the various ALT-PE categories by boys and girls for the context level. The data obtained for the two groups revealed similarities within two categories of the context level, that is, general content and subject motor. Boys spent 34.4% of their time on general content, while girls spent 33.3% of their time on general content. There was a great difference between the time devoted to subject matter knowledge by boys ( 19.3%) and that of girls (8.5%). However, similar percentages resulted in subject matter motor, where 46.4% (boys) and 46.1% ( girls) were observed; respectively.

Examination of the subcategory of the subject matter motor in Table 3a showed an interesting and similar pattern of use of time by boys and girls. Both groups of students spent the same percentage of time for skill practice (35.8%), scrimmage (0.8%) and game (9.8%).

Table 3 b. Percent of observed intervals spent in ALT-PE categories for male ( 100) and female (80) students (Learner Involvement Level).

LEARNER INVOLVEMENT LEVEL	MALE STUDENTS		FEMALE STUDENTS	
	MEAN %	SD	MEAN %	SD
<b>Not Motor Engaged</b>				
Interim	1.3	2.6	1.8	3.9
Waiting	17.4	10.7	21	13.3
Off-task	1.8	5.7	2.6	9
On-task	32.3	10.8	31.3	12.6
Cognitive	19.5	8.4	20.4	8.3
<b>Sub-total</b>	<b>72.3</b>		<b>77.1</b>	
<b>Motor Engaged</b>				
Motor Appropriate	22.5	15.5	17.1	11.5
Motor Inappropriate	2.7	5.6	4	5.6
Supporting	2.2	4.3	1.3	3.8
Inappropriate Unsuccessful	0.1	0.8	0.5	2
Inappropriate Successful	*	0.3	0	1.2
Appropriate Unsuccessful	*	0.3	0.1	0.8
<b>Sub-total</b>	<b>27.5</b>		<b>23</b>	
<b>Total</b>	<b>100</b>		<b>100</b>	

\* Denotes a value less than .1.

Comparisons of the percent of total observed intervals spent in the learner involvement level however revealed some differences. Boys were not motor engaged for 72.3% of the time, while girls were not motor engaged 77.1% of the time. In contrast, boys were motor engaged 27.5% of the observed time while girls were motor engaged 23% of the observed time.

When students were motor engaged, boys were found to perform motor activities 22.5% of the time with success, while girls responded to motor activities with success 17.1% of the time. For the girls motor activities chosen were inappropriate 4% of the time and for the boys 2.7% of the time.

#### Teacher and ALT-PE Data

Table 4a. Percent of observed intervals spent in ALT-PE categories for male student teachers and female student teachers (context level).

CONTEXT LEVEL	MALE STUDENT TEACHERS		FEMALE STUDENT TEACHERS	
	MEAN %	SD	MEAN %	SD
<b>General Content</b>				
Transition	18.2	6.8	20	7.9
Management	0.3	1.8	*	0.2
Break	*	0.4	0	0
Warm-up	13.5	8.2	16.4	7.4
<b>Sub-total</b>	<b>32</b>		<b>36.4</b>	
<b>Subject Matter</b>				
<b>Knowledge</b>				
Technique	17.8	8.4	22	8.1
Strategy	*	0.9	0	0
Rules	*	0.2	0	0
Social Behavior	0.2	0.8	*	0.3

Background	*	0.5	0	0
<b>Sub-total</b>	<b>18</b>		<b>22</b>	
<b>Subject Matter</b>				
<b>Motor</b>				
Skill Practice	38.6	16.6	32.2	14.3
Scrimmage	1.3	3.5	0.1	0.8
Game	10.3	10.7	8.8	10.8
Fitness	*	0.5	0	0
<b>Sub-total</b>	<b>50.2</b>		<b>41.1</b>	
<b>Total</b>	<b>100</b>		<b>10</b>	

**\*Denotes a value less than .1**

Table 4a shows a report of overall percentages of observed intervals devoted to the various ALT-PE by male student teachers and female student teachers. The descriptive analysis of the data obtained for the two groups of teachers showed differences within all three categories of the context level. Students of male student teachers devoted 32% of their time to general content, while students of female student teachers spent 36.4% of their time in general content. Male student teachers provided for 18% of observed interval allocated to subject matter knowledge, as compared to 22% provided by the female student teachers. With regard to the subject matter motor, male student teachers provided for 50.2% and female student teachers 41%.

The subcategory of subject matter motor revealed that, both groups of teachers used time differently. The male student teachers structured more skill practice (38.6%) and more game activity (10.3%) than the female student teachers ( skill practice, 32.2% ; game activity, 8.8%).

Table 4b. Percent of observed intervals spent in ALT-PE categories for male student teachers and female student teachers ( Learner Involvement Level).

LEARNER INVOLVEMENT LEVEL	MALE STUDENT TEACHERS		FEMALE STUDENT TEACHERS	
	MEAN %	SD	MEAN %	SD
<b>Not Motor Engaged</b>				
Interim	1.6	2.6	1.4	3.8
Waiting	20.2	11.6	17.5	12.4
Off-task	2.1	7.5	2.2	7.3
On-task	30.3	11.1	33.8	11.9
Cognitive	17.9	7.6	22.5	8.6
<b>Sub-total</b>	<b>72.1</b>		<b>77.4</b>	
<b>Motor Engaged</b>				
Motor Appropriate	24	13.9	15.1	12.8
Motor Inappropriate	2.7	5.4	3.9	6
Supporting	0.9	2.6	2.9	5.3
Inappropriate Unsuccessful	0.5	2	*	0.2
Inappropriate Successful	0.3	1.1	0	0
Appropriate Unsuccessful	0.1	0.7	*	0.2
<b>Sub-total</b>	<b>28.5</b>		<b>21.9</b>	
<b>Total</b>	<b>100</b>		<b>100</b>	

\* Denotes a value less than .1.

Comparing percent of total observed intervals spent within two categories of the learner involvement level in Table 4b indicated some differences between the two groups of teachers. Students of the male student-teachers were not engaged for 72.1% of the time, while students of the female student-teachers were not motor engaged for 77.4% of the time. On the contrary, students of male teachers were motor engaged for 28.5% of the observed intervals, while students of female teachers were motor engaged for only 21.9% of the observed intervals.

Table 4b further revealed that male teachers also provided more waiting time ( male, 20.2%, female, 17.5%) and more motor appropriate time (male, 24% female, 15.1%). Since motor appropriate behavior is indicative of the academic learning time in physical education provided, the descriptive data revealed that the male student-teachers were more effective than female student-teachers in view of this criterion.

#### Skill level and ALT-PE Data

Table 5a. Percent of observed intervals spent in ALT-PE categories for high-skilled, medium-skilled, and low-skilled students(Context Level)

CONTEXT LEVEL	HIGH- SKILLED		MEDIUM-SKILLED		LOW-SKILLED	
	Mean %	SD	Mean %	SD	Mean %	SD
<b>General Content</b>						
Transition	19	7.8	19.6	7.6	18.5	6.7
Management	0.4	0.4	0.4	2.4	*	0.2
Break	*	0.5	*	0.5	0	0
Warm-up	15	8.1	14.4	8	14.9	7.9
<b>Sub-total</b>	<b>34.4</b>		<b>34.4</b>		<b>33.4</b>	

<b>Subject Matter Knowledge</b>						
Technique	19.3	9.4	19.9	8.1	19.8	8.2
Strategy	0.2	1.2	0	0	0	0
Rules	0	0	0	0	*	0.3
Social Behavior	*	0.6	0.2	0.7	0.1	0.6
Background	*	0.5	*	0.5	0	0
<b>Sub-total</b>	<b>19.5</b>		<b>20.1</b>		<b>19.9</b>	
<b>Subject Matter Motor</b>						
Skill Practice	35.5	16	35.5	16.1	36.3	15.9
Scrimmage	1.1	3.3	0.7	2.4	0.6	2.3
Game	9.2	9.7	9.9	11	9.9	11.5
Fitness	*	0.5	*	0.5	0	0
<b>Sub-total</b>	<b>45.8</b>		<b>46.1</b>		<b>46.8</b>	
<b>Total</b>	<b>100</b>		<b>100</b>		<b>100</b>	

\* Denotes a value of less than .1.

As shown in Table 5a, students rated by the teachers as high, medium, or low - skill level were in skill practice similar percentage of the time ( 35.5% , 35.5% , and 36.3%) respectively. Small differences were, however, found in terms of functional engagement in activity. High-skilled students performed motor activities with success 21.8% of the observed time, medium-skilled students 20.7% of the time and low-skilled students 17.8% of the

observed time as shown in Table 5b.

Table 5b. Percent of observed intervals spent in ALT-PE categories for high-skilled, medium-skilled, low-skilled level students(Learner Involvement Level).

LEARNER INVOLVEMENT LEVEL	HIGH-SKILLED		MEDIUM-SKILLED		LOW-SKILLED	
	MEAN %	SD	MEAN %	SD	MEAN %	SD
<b>Not Motor Engaged</b>						
Interim	1.8	4.3	1.3	2.7	1.4	2.3
Waiting	17.8	11.3	18.1	12.3	21	12.4
Off-task	2.5	8.5	1.8	4	2.2	8.6
On-task	31.7	12.1	32.4	11.4	31.4	11.4
Cognitive	19.8	9.1	19.9	7.8	20.1	8.3
<b>Sub-total</b>	<b>73.6</b>		<b>72.2</b>		<b>76.1</b>	
<b>Motor Engaged</b>						
Motor Appropriate	21.8	16.3	20.7	13.2	17.8	12.5
Motor Inappropriate	1.4	3.1	3.3	4.9	5.2	7.5
Supporting	1.6	3.6	1.9	4.1	1.9	4.5
Inappropriate Unsuccessful	0.2	1	*	0.5	0.6	2.3
Inappropriate Successful	*	0.3	*	0.4	0.4	1.4
Appropriate Unsuccessful	*	0.3	0	0	0.2	0.9

<b>Sub-total</b>	<b>25</b>		<b>25.9</b>		<b>26.1</b>	
<b>Total</b>	<b>100</b>		<b>100</b>		<b>100</b>	

\* Denotes a value less than .1.

Furthermore, in Table 5b, high-skilled students were involved with motor activities that were either too easy or too difficult 1.4% of the time, medium-skilled students 3.3% of the time and low-skilled 5.2% of the time. Successful motor responses made by the low-skilled students were 0.4% of the time with inappropriate physical form.

## DISCUSSION

The main purpose of the study was to use the ALT-PE observational instrument to describe the ALT-PE patterns of students taught by preservice teachers in physical education classes.

The results of this study present interesting issues for discussion regarding the teaching of physical education in the Ghanaian setting.

On the whole, the students observed in this study spent 66% of their time on subject matter related to the lessons as opposed to 33.9% of the time within the general content. When lesson time was in general content students were usually in transition 19% of the time. This seems reasonable for preservice teachers who are learning to improve their managerial skills. Previous research studies show that 15%-35% of class time is devoted to management episodes of this nature ( Luke, 1989; McLeish, 1981; Placek & Randall, 1986; Metzler, 1989), and the average being 25% for elementary schools and 22% for secondary schools. The percentage of class time (19%) spent on transition may be attributed to the team games which formed the subject matter for most of the lessons observed. Teaching lessons in, for example, basketball, volleyball, soccer, gymnastics require a lot of movement from place to place by the students. They group and regroup for practices and to choose teams.

This present results of 14.7% pertaining to warm-up was rather high. It is possible that the student teachers may have misconstrued the role of warm-up in the physical education lesson plan. This may stem from the undue emphasis placed on warm-up in the physical education lesson plan in Ghana. The lesson plan provides for both general and specific warm-ups. The general warm-up activities are supposed to tune up the muscles of the body for work

while the specific warm-up activities are meant not only to affect the muscles related to the skills to be taught but also lend themselves to the teaching of the skill. It is possible therefore for the student teachers to have thought of warm-up as a subject matter motor category.

The student teachers devoted approximately 20% of the time describing activities to their students and showing them how to do it. Much as it is important that accurate information be passed on to students, too much time was spent on technique. As a result, valuable time for subject matter motor activities was lost. Perhaps the student teachers focused on lesson content that required emphasis on technique.

When students were engaged in subject matter motor, 35.8% of the time was spent on skill practice as opposed to scrimmage (0.8%) and game (9.7%). This is a little higher than the average percentage of 25%-30% reported by (Anderson, 1978; Metzler, 1979; Pieron, 1980; Rate, 1980). It could be that the student teachers emphasized on developing psychomotor skills. Virtually all the lessons observed had objectives stated in the psychomotor domain. Probably by taking the following courses in "Introduction to teaching skills and strategies", "Investigating teaching" and "Supervision of student teachers" prior to student teaching, the student teachers may have been taught that students learn more when they practice more, especially in learning motor skills.

The learner involvement data revealed that students spent 74.4% of the time not motor engaged. They spent 19% of the time waiting for their turn to participate in activities. This result is very close to the minimum of 20% reported by Siedentop (1991) as time students spend in waiting in a physical education lesson. The student teachers may have had problem organizing and managing the students to be involved with the lessons. This could be attributed

partly to the large class size prevalent in most of the public Junior Secondary Schools in Ghana, particularly in the Winneba school district. Generally, most teachers express concern or say class size creates a hindrance to quality instruction ( O'Sullivan, 1989; O'Sullivan & Dyson, 1994). Tyson (1996) pointed out that with large classes, the physical educator's role becomes that of a monitor rather than a teacher. Most of these schools also do not have sufficient facilities and equipment to facilitate the teaching of physical education lessons. In one school, for example, there was no playing field and the space available for physical education lessons was rather inadequate. There is the need for more equipment and better facilities to enhance the job of the physical educator.

The present results show that class time that contributed to learning outcomes was 20.1% . This falls within the range of 10-20% reported in previous studies by Dodds, Rife, and Metzler, (1982). Metzler (1989) reported that for an average class, students get no more than 10-20% of class time in functional engagement in activity.

The data for high-skilled, medium-skilled, and low-skilled level students categorized by the teachers showed very few differences in observed percentages at the learner involvement level. Two reasons could be assigned to this finding. First, the student teachers provided equal opportunity to learn for each student despite his or her ability. The low-skilled students had fewer successes during motor activities than the medium- or high-skilled students. It is also evident from the results that even though they were successful some part of the time in the assigned activity, their physical form was 5.2% of the time inappropriate. Secondly, it could be that there was a deficiency in the categorization of the students into the ability groups due to the limited time period at the disposal of the student teachers. In recent times, the official time

period for student teaching and field experiences at the University College of Education, Winneba has not exceeded four weeks. This is far below the average length of time ( 10-12 weeks full-time experience) reported by Guyton & MacIntyre, (1990). The student teachers in this study were supposed to use the first week of student teaching to categorize the students into their ability groups. Considering the activities that usually mark the week of any student teaching ( teaching of routines, observations, learning of students names etc), it is possible that the classification of the students into the ability groups was done in haste and therefore was deficient.

Although equal opportunity was provided for both boys and girls in terms of subject matter motor, the boys found motor activities more appropriate and successful than the girls. This does not compare favorably with other studies such as those by Shute, Dodds, Placek, Rife, and Silvermann ( 1982); Placek et al.,(1982); & Silvermann et al., (1984), who reported that student sex or gender was not a significant variable accounting for differences in ALT-PE. The results of this study with regard to gender must be used with caution since the girls and boys for this study were of different skill level.

The high percentage of class time devoted to skill practice and game showed that the male student teachers emphasized more on developing the psychomotor than the female teachers, whose concern was to give information on the correct physical form or topography of a motor skill. Male student teachers were eventually able to get more ALT-PE than their female counterparts. This does not conform with the findings by O'Sullivan (1980) and Holding (1981) who reported that lessons in physical education taught by male and female teachers showed no significant differences.

## Chapter V

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter provides for a summary of the study and outlines conclusions and recommendations drawn from the results.

#### SUMMARY

The purpose of the study was to utilize the ALT-PE observational instrument to describe the ALT-PE Patterns of students taught by preservice teachers.

Chapter one presented a brief background information of the study, including the statement of the problem and purpose of the study. It listed six assumptions and stated the limitations and delimitations of the study. Terms were defined to explain usage in the study

The chapter on the review of literature was structured under four headings : (a) the history of ALT-PE ,(b) early ALT-PE efforts and studies, (c) limitations of ALT-PE , and the (d) research on effective teaching. In this chapter, the long, impressive history of ALT-PE instrument were also presented. The chapter also indicated certain limitations and criticisms pointed out by users of the ALT-PE system and ends by reiterating the effectiveness of the ALT-PE instrument in dealing with teacher effectiveness.

Chapter three dealt with the methods and procedures used for this study. The chapter focused on subjects, observation procedures, training procedures and observation, ALT-PE data collection, and data analysis procedures. Subjects used were Junior Secondary School students ranging from JSS 1-3, with 11 undergraduate preservice teachers who were doing their student teaching in physical education. The ALT-PE Version 2 interval recording was used for data collection. The first step in analyzing the data was categorizing them into context

and learner involvement levels, and then expressing each as a frequency of occurrence. This was done for each lesson observed in which the target students were high, medium, and low-skilled performers. The SPSS program was used to generate descriptive statistics on mean percentages and standard deviations.

Results of the study and discussion are presented in chapter four under the following headings: (a) overall descriptive ALT-PE data, (b) gender and ALT-PE data, (c) teacher and ALT-PE data, (d) skill level and ALT-PE data. The structure of presentation is in relation to the research questions formulated in this study.

## CONCLUSIONS

The following conclusions were drawn from the study:

1. ALT-PE accrued by the preservice teachers was 20.1% which is about the maximum for any physical education lesson.
2. ALT-PE was moderately higher for male student teachers (24%) than female student teachers (15.1%).
3. Boys in this study accrued more ALT-PE (22.5%) than the girls (17.1%). However, it must be stated that the girls and boys selected for the study were of different skill levels.
4. The low-skilled students accrued less ALT-PE (17.8%) than the medium-skilled (20.7%) and high-skilled (21.8%).
5. Too much time was spent in transitions (19%), waiting (19%) and warm-up (14.7%).

## RECOMMENDATIONS

Based upon the findings of this study the following recommendations were made:

1. The ALT-PE observation instrument should be used in supervising preservice teachers during student teaching to provide them with data-based feedback.
2. Preservice teachers must be trained to use systematic observation instrument to provide feedback about their teaching.
3. Preservice teachers should be helped during their early field experiences to develop effective managerial skills.
4. Teachers should not spend too much time on activities unrelated to the subject matter motor, particularly warm-up.
5. Preservice teachers should structure the physical education class in such a way that the affective and cognitive domains are also catered for.
6. Teachers should take cognizance of the varying skill levels of performance of students in a physical education class when setting learning tasks, and develop teaching strategies to help low-skilled students to achieve success in a progressive manner.
7. Teachers should shift from the lecture model of teaching physical education and adopt a teaching style that allows students ample time for skill practice.
8. The curriculum and instruction components of the teacher preparation program at UCEW should assist student teachers to plan units and lessons in order to prepare and implement effective instruction.
9. Future research study using a variety of intervention packages to determine if there will be an increase in the amount of ALT-PE provided by preservice physical education

teachers during student teaching is highly recommended.

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## **APPENDIX A**

## Academic Learning Time-Physical Education ( ALT-PE)

Date: \_\_\_\_\_ Teacher: \_\_\_\_\_ School: \_\_\_\_\_

Class /Activity: \_\_\_\_\_ Observer: \_\_\_\_\_

Start time \_\_\_\_\_ Stop time \_\_\_\_\_ Duration \_\_\_\_\_ Page \_\_\_\_\_ of \_\_\_\_\_

This observation is day \_\_\_\_\_ of \_\_\_\_\_ days in this unit.

The teacher allocated \_\_\_\_\_ minutes of activity time for this lesson.

The source of this allocation information was ( teacher, lesson plan)

**Observer comments on this class:**

### Data summary

Total time \_\_\_\_\_ Allocated practice time \_\_\_\_\_ ALT-PE \_\_\_\_\_

Context level data: general content \_\_\_\_\_  
subject matter knowledge \_\_\_\_\_ subject matter motor \_\_\_\_\_

Level involvement data: not motor engaged \_\_\_\_\_ motor engaged \_\_\_\_\_

Academic Learning Time-Physical ( ALT-PE) demographic information recording sheet

## **APPENDIX B**

Academic Learning Time - Physical Education (ALT T-PE)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
S _____	C																									
	LI																									

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
S _____	C																									
	LI																									

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
S _____	C																									
	LI																									

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
S _____	C																									
	LI																									

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
S _____	C																									
	LI																									

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
S _____	C																									
	LI																									

**Context level ( C )**

- Subject matter
- General content
- Transition (T)
- Management (M)
- Break ( B)
- Warm-UP (WU)
- Technique (TN)
- Strategy (ST)
- Rules (R)
- Social behavior (SB)
- Background (BK)

- Subject matter
- motor
- Skill practice ( P)
- Scrimmage/routine (S)
- Game (G)
- Fitness (F)

**Learner involvement level (LI)**

- Not motor
- engaged
- Interim (I)
- Waiting (W)
- Off-task (OF)
- On-task (ON)
- Cognitive (C)
- Motor engaged
- Motor appropriate (MA)
- Motor Inappropriate (MI)
- Supporting (MS)
- Inappropriate Unsuccessful (IU)
- Inappropriate Successful (IS)
- Appropriate Unsuccessful (AU)

**APPENDIX C**

## ACADEMIC LEARNING TIME-PE OVERALL DATA

sub	gen	tr	date	time	t	m	b	wu	tn	st	r	sb	bk	p	s	g	f	l	w	of	on	c	ma	mi	ms	iu	is	au
1	2	1			30.8	0	0	9.62	28.9	0	0	0	0	19.2	0	11.5	0	0	3.85	0	36.5	30.5	28.9	0	0	0	0	0
2	1	1			26.9	0	0	7.69	28.9	0	0	0	0	17.3	0	19.2	0	0	1.92	0	36.5	28.9	30.8	1.92	0	0	0	0
3	2	1			30.8	0	0	7.69	25	0	0	0	0	19.2	0	17.3	0	0	1.92	0	38.5	25	34.6	0	0	0	0	0
1	1	1			20	0	0	15.6	15.6	0	0	0	0	48.9	0	0	0	0	24.4	0	35.6	15.6	24.4	0	0	0	0	0
2	1	1			13.6	0	0	20.5	11.4	0	0	0	0	54.6	0	0	0	0	6.82	2.27	34.1	13.6	34.6	9.09	0	0	0	0
3	2	1			27.3	0	0	11.4	9.09	0	0	0	0	52.3	0	0	0	0	4.55	4.55	38.6	9.09	13.6	22.7	0	0	0	6.82
1	1	2			23.3	0	0	13.3	25	0	0	0	0	20	0	18.3	0	0	11.7	0	35	28.3	25	0	0	0	0	0
2	1	2			21.7	0	0	13.3	25	0	0	0	0	20	0	20	0	0	10	0	33.3	28.3	28.3	0	0	0	0	0
3	2	2			20	0	0	13.3	25	0	0	0	0	21.7	0	20	0	0	10	0	33.3	25	31.7	0	0	0	0	0
1	1	1			13.5	3.85	0	23.1	7.69	0	0	0	3.85	36.5	0	11.5	0	0	30.8	0	42.3	7.69	19.2	0	0	0	0	0
2	1	1			12	0	0	20	14	0	0	0	4	38	0	12	0	0	26	0	36	14	24	0	0	0	0	0
3	2	1			13.6	0	0	25	11.4	0	0	0	0	50	0	0	0	2.27	43.2	2.27	45.5	11.4	2.27	0	0	4.55	0	0
1	1	2			15.9	0	0	13.6	20.5	0	0	0	0	50	0	0	0	0	38.6	4.55	18.2	20.5	18.2	0	0	0	0	0
2	1	2			12.8	0	0	19.2	17	0	0	0	0	51.1	0	0	0	0	36.2	0	31.9	17	14.9	0	0	0	0	0
3	2	2			9.3	0	0	20.9	20.9	0	0	0	0	46.5	0	0	0	0	30.3	0	30.2	20.9	20.9	0	0	0	0	0
1	1	1			20.5	0	0	7.69	23.1	0	0	0	0	48.7	0	0	0	5.13	18	0	28.2	20.5	28.2	0	0	0	0	0
2	2	1			23.1	0	0	10.3	20.5	0	0	0	0	46.2	0	0	0	2.56	23.1	0	30.8	20.5	23.1	0	0	0	0	0
3	1	1			22.2	0	0	8.33	19.4	0	0	0	0	50	0	0	0	2.8	25	0	33.3	16.7	22.2	0	0	0	0	0
1	1	1			40	0	0	10	28	0	0	0	0	22	0	0	0	0	18	0	42	26	14	0	0	0	0	0
2	2	1			38.9	0	0	11.1	25.9	0	0	0	0	24.1	0	0	0	0	16.7	0	37	25.9	18.6	1.85	0	0	0	0
3	2	1			35.3	0	0	19.6	15.7	0	0	0	0	29.4	0	0	0	0	17.1	0	41.2	25.5	15.7	0	0	0	0	0
1	1	1			7.14	0	0	10.7	44.6	0	0	0	0	21.4	0	16.1	3.57	5.36	0	21.4	42.9	25	0	0	0	1.79	0	0
2	1	1			14	0	0	14	35.1	0	0	0	0	21.1	0	15.8	3.51	12.3	0	26.3	33.3	24.6	0	0	0	0	0	0
3	2	1			12.3	0	0	14	38.6	0	0	0	0	19.3	0	15.8	0	0	10.5	0	25	40.4	21.1	1.75	0	1.75	0	0
1	1	1			15.4	0	0	7.69	23.1	0	0	0	0	23.1	9.62	21.2	0	1.92	40.4	0	17.3	25	9.62	0	5.77	0	0	0
2	2	1			15.7	0	0	9.8	19.6	0	0	0	0	25.5	7.84	21.6	0	7.84	43.1	0	15.7	21.6	3.92	1.96	5.88	0	0	0
3	2	1			15.7	0	0	11.5	17.7	0	0	0	0	29.4	5.88	19.6	0	3.92	49	0	17.7	19.6	7.84	0	1.96	0	0	0
1	1	2			9.76	0	0	22	36.6	0	0	0	0	26.8	0	4.88	0	0	0	36.6	36.6	7.32	2.44	9.96	0	0	0	0
2	1	2			15.8	0	0	21.1	42.1	0	0	0	0	15.8	0	5.26	0	0	2.63	0	36.8	42.1	13.2	2.63	2.63	0	0	0
3	2	2			18.4	0	0	23.7	34.2	0	0	0	0	18.4	0	5.26	0	0	0	44.7	34.2	5.26	5.26	10.5	0	0	0	0
1	1	1			12.5	0	0	5	5	0	0	0	0	70	0	7.5	0	5	12.5	2.5	15	5	52.5	7.5	0	0	0	0
2	1	1			12.8	0	0	0	5.13	0	0	0	0	82.1	0	0	0	2.56	15.4	0	15.4	5.13	43.6	12.8	5.13	0	0	0
3	2	1			10.3	0	0	2.56	7.69	0	0	0	0	79.5	0	0	0	5.13	18	7.69	12.8	7.69	30.8	18	0	0	0	0
1	1	1			18.8	0	0	8.33	8.33	0	0	0	0	64.6	0	0	0	0	16.7	0	27.1	10.4	45.8	0	0	0	0	0
2	1	1			25	0	0	8.33	6.25	0	0	0	0	60.4	0	0	0	2.08	12.5	0	33.3	6.25	39.6	0	6.25	0	0	0
3	2	1			18.8	0	0	8.33	12.5	0	0	0	0	60.4	0	0	0	0	25	0	27.1	12.5	35.4	0	0	0	0	0
1	1	1			22.7	0	0	15.9	13.6	0	0	0	0	43.2	4.55	0	0	0	11.4	0	38.6	13.6	36.4	0	0	0	0	0
2	1	1			23.3	0	0	18.6	14	0	0	0	0	41.9	2.33	0	0	0	9.3	0	41.9	14	34.9	0	0	0	0	0
3	2	1			20.9	0	0	18.6	20.9	0	0	0	0	34.9	4.65	0	0	2.33	14	0	39.5	20.9	23.3	0	0	0	0	0
1	1	2			17.7	0	0	7.84	15.7	0	0	0	0	21.6	0	37.3	0	0	11.8	0	25.5	15.7	47.1	0	0	0	0	0
2	1	2			12	0	0	6	16	0	0	0	0	24	0	42	0	0	14	0	20	16	50	0	0	0	0	0
3	2	2			5.77	0	0	5.77	23.1	0	0	0	0	19.2	0	46.2	0	0	28.9	0	11.5	23.1	36.5	0	0	0	0	0
1	1	2			26.8	0	0	14.1	11.3	0	0	0	0	26.8	0	21.1	0	12.7	0	43.7	11.3	32.4	0	0	0	0	0	0
2	1	2			23.3	0	0	13.7	17.8	0	0	0	0	27.4	0	17.8	0	1.37	9.59	0	42.5	19.2	27.4	0	0	0	0	0
3	2	2			24.7	0	0	13	11.7	0	0	0	0	20.8	0	16.9	0	1.3	9.09	5.19	39	7.79	20.8	16.9	0	0	0	0
1	2	2			27.9	0	0	11.5	14.8	0	0	0	0	32.8	0	13.1	0	3.27	50.8	0	27.9	14.8	3.28	0	0	0	0	0
2	2	2			22	0	0	11.9	13.6	0	0	0	0	40.7	0	10.2	0	0	61	0	20.3	15.3	1.7	1.7	0	0	0	0
3	2	2			21.8	0	0	10.9	12.7	0	0	0	0	38.2	0	16.4	0	1.82	54.6	0	20	20	1.82	1.82	0	0	0	0
1	1	1			19.6	0	0	5.36	14.3	0	0	1.79	0	58.9	0	0	0	1.79	16.1	1.79	17.9	14.3	19.6	3.57	12.5	0	0	0
2	2	1			17	0	0	1.89	22.6	0	0	3.77	0	54.7	0	0	0	3.77	17	3.77	15.1	22.6	15.1	11.3	5.66	3.77	1.89	0
3	1	1			19.6	0	0	1.96	19.6	0	0	0	0	58.8	0	0	0	1.96	13.7	0	15.7	23.5	35.3	0	9.8	0	0	0
1	1	1			21.2	0	0	3.92	23.1	0	0	3.92	0	48.1	0	0	0	0	17.3	1.92	19.2	26.9	32.7	0	1.92	0	0	0
2	1	1			25	0	0	3.85	21.2	0	0	3.85	0	46.2	0	0	0	0	11.5	9.62	17.3	25	28.9	0	7.69	0	0	0
3	2	1			22	0	0	4	16	0	0	2	0	56	0	0	0	10	12	66	20	16	18	6	12	0	0	0
1	2	1			28	0	0	14	26	0	0	0	0	32	0	0	0	4	12	8	32	24	14	6	0	0	0	0
2	1	1			26.5	0	0	14.3	26.5	0	0	0	0	32.7	0	0	0	0	14.3	4.08	30.6	26.5	24.5	2.04	0	0	0	0
3	2	1			19.2	0	0	13.5	32.7	0	0	0	0	34.6	0	0	0	0	19.2	0	26.9	32.7	7.69	3.85	0	0	9.62	0
1	1	2			10.3	0	0	17.2	10.3	0	0	0	0	56.9	0	5.17	0	3.45	27.6	0	19	10.3	36.2	3.45	0	0	0	0
2	1	2			15	0	0	11.7	15	0	0	0	0	55	0	3.33	0	0	16.7	8.33	23.3	15	21.7	15	0	0	0	0
3	2	2			20.3	0	0	13.6	11.9	0	0	0	0	49.2	0	5.08	0	1.69	22	0	25.4	11.9	37.3	1.69	0	0	0	0
1	1	1		</																								



1	1	2		24.1	0	0	10.3	19	0	0	0	0	34.5	0	12.1	0	5.17	31	1.72	34.5	19	5.17	3.45	0	0	0	0
2	1	2		30.4	0	0	12.5	17.9	0	0	0	0	33.9	0	5.36	0	1.78	32.1	1.79	39.3	17.9	3.57	3.57	0	0	0	0
3	1	2		25.9	0	0	10.3	19	0	0	0	0	32.8	0	12.1	0	1.72	29.3	3.45	31	20.7	6.9	6.9	0	0	0	0
1	1	1		13.2	0	0	36.8	15.8	0	0	0	0	15.8	0	18.4	0	0	15.8	0	50	15.8	18.4	0	0	0	0	0
2	2	2		13.5	0	0	37.8	10.8	0	0	0	0	18.9	0	18.9	0	0	18.9	0	48.7	10.8	21.6	0	0	0	0	0
3	2	1		21.1	0	0	31.6	15.8	0	0	0	0	21.1	0	10.5	0	0	21.1	0	50	15.8	13.2	0	0	0	0	0
1	1	1		10.6	2.13	0	21.3	8.51	0	0	0	0	25.5	0	23.4	0	0	25.5	0	34	8.51	31.9	0	0	0	0	0
2	1	1		14.3	0	0	19.1	7.15	0	0	0	0	33.3	0	26.2	0	0	31	0	33.3	7.14	28.6	0	0	0	0	0
3	2	1		16.7	0	0	11.9	11.9	0	2.38	0	0	31	0	26.2	0	0	33.3	0	26.2	14.3	26.2	0	0	0	0	0
1	1	2		46.7	0	0	13.3	20	0	0	0	0	13.3	0	6.67	0	0	8.89	0	57.8	20	4.44	0	8.89	0	0	0
2	1	2		40.9	0	0	9.09	29.6	0	0	0	0	13.6	0	6.82	0	0	0	2.27	47.7	29.6	4.55	0	15.9	0	0	0
3	2	2		33.3	0	0	11.1	31.1	0	0	0	0	15.6	0	8.89	0	0	6.67	0	42.2	31.1	0	8.89	11.1	0	0	0
1	2	2		5.77	0	0	1.92	30.8	0	0	0	0	61.5	0	0	0	0	19.2	0	5.77	30.8	13.5	0	0	0	0	0
2	2	2		3.85	0	0	1.92	34.6	0	0	0	0	59.6	0	0	0	0	15.4	0	3.85	34.6	38.5	7.69	0	0	0	0
3	2	2		7.69	0	0	1.92	30.8	0	0	0	0	59.6	0	0	0	0	17.3	1.92	7.69	30.8	34.6	7.69	0	0	0	0
1	2	2		16	0	0	14	12	0	0	0	0	58	0	0	0	8	32	0	32	12	8	8	0	0	0	0
2	1	2		11.5	0	0	13.5	19.2	0	0	0	0	55.8	0	0	0	5.77	40.4	0	25	19.2	7.69	1.92	0	0	0	0
3	1	2		13.5	0	0	15.4	19.2	0	0	0	0	51.9	0	0	0	5.77	25	0	30.8	19.2	11.5	7.69	0	0	0	0
1	2	1		15.4	0	0	5.77	25	0	0	0	0	51.9	0	1.92	0	0	34.6	0	21.2	25	17.3	1.92	0	0	0	0
2	2	1		19.2	0	0	3.85	21.2	0	0	0	0	53.9	0	1.92	0	0	25	1.92	21.2	21.2	26.9	3.85	0	0	0	0
3	2	1		17.3	0	0	3.85	23.1	0	0	1.92	0	50	0	3.85	0	0	36.8	0	21.2	25	15.4	11.5	0	0	0	0
1	1	1		14.3	0	0	10.2	14.3	0	0	0	0	20.4	16.3	24.5	0	0	24.5	0	20.4	16.3	36.7	2.04	0	0	0	0
2	1	1		14.3	0	0	8.16	16.3	0	0	0	0	22.5	0	38.8	0	0	24.5	0	34.7	16.3	24.5	0	0	0	0	0
3	2	1		12.2	0	0	12.2	14.3	0	0	0	0	20.4	0	40.8	0	2.04	24.5	0	30.6	14.3	24.5	4.08	0	0	0	0
1	1	1		13.5	0	0	9.62	21.2	0	0	0	0	32.7	0	23.1	0	0	36.5	0	19.2	21.2	17.3	0	5.77	0	0	0
2	1	1		15.7	0	0	9.8	19.6	0	0	0	0	33.3	0	21.6	0	0	33.3	0	21.6	17.7	25.5	0	1.96	0	0	0
3	2	1		11.5	0	0	17.3	15.4	0	0	0	0	34.6	1.92	19.2	0	0	36.5	1.92	23.1	17.3	19.2	0	1.92	0	0	0
1	2	1		23.4	0	0	25.5	23.4	0	0	0	0	19.2	0	8.51	0	0	14.9	4.26	46.8	25.5	8.51	0	0	0	0	0
2	2	1		28.3	0	0	23.9	15.2	0	0	0	0	21.7	0	10.9	0	0	13	2.17	47.8	15.2	13	8.7	0	0	0	0
3	2	1		32.6	0	0	21.7	15.2	0	0	0	0	17.4	0	13	0	0	15.2	0	52.2	15.2	13	4.35	0	0	0	0

**KEY:**

**SUBJECTS- 1- High-skilled**

**2- Medium-skilled**

**3- Low-skilled**

**GENDER... 1- Male**

**2- Female**

**TEACHER... 1- Male Teacher**

**2- Female Teacher**