A pilot study to improve academic learning time in physical education

Robert Walker

Edith Cowan University
Edith Cowan University

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A PILOT STUDY TO IMPROVE

ACADEMIC LEARNING TIME IN PHYSICAL EDUCATION

by

Robert Walker

B.A.(Ed.), W.A.C.A.E.

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ABSTRACT

Academic Learning Time in Physical Education (ALT-PE) is defined as the portion of engaged time when a student is involved in practice appropriate to his or her ability. The amount of time students are appropriately engaged in physical education activities has been found to have a high correlation with student achievement (Godbout, Brunelle & Tousignant, 1983; Graham, Soares & Harrington, 1983; Harrison, 1987; Phillips & Carlisle, 1983; Placek & Randall, 1986; Silverman, 1985).

The teacher has control over the amount of time children can practise the criterion skill in a particular lesson. Investigating the way in which the students spend time during the lesson will aid those who want to improve the teaching-learning process.

This study aimed to increase the amount of ALT-PE provided to a class by a primary school physical education specialist. To increase the amount of ALT-PE a student receives in a lesson required a modification of the teacher’s behaviour. Clinical supervision provided valuable feedback to the teacher in an attempt to increase the amount of ALT-PE.

Two Year 6 classes, and a primary physical education specialist formed the subjects for this study. The children were from a coeducation government primary school. The study used a single subject A-B research design.

The students and teacher were observed during six mini-tennis lessons. The first three lessons for tennis were conducted with one Year 6 class. These lessons were used to form a baseline for the amount of ALT-PE received by students.
When forming the baseline from which to intervene, efforts were made to match the content and sample of children. The teacher taught the next three lessons with similar content to the other Year 6 class. However, after each lesson the teacher received feedback about the amount of ALT-PE that students received. Discussions with the teacher occurred in an attempt to modify the teacher's behaviour.

To gather data about ALT-PE, the ALT-PE/SPORT Observation Instrument developed by Wilkinson and Taggart (1989) was used. This required interval recording on a selected individual representing the class, and produced a percentage breakdown of the time for the lessons. Anecdotal notes were also taken for each lesson to assist the recording of key teaching-learning behaviours.

The results from the baseline phase of the study showed that the teacher compared closely to other studies in the literature. Following intervention that involved clinical supervision by the researcher, the teacher increased the average amount of ALT-PE from 17.3% to 42.2%. This represented an average increase of 24.9% following intervention.

To achieve such an increase in ALT-PE the teacher modified many teaching behaviours and altered the skill practices that were originally used in the baseline. Transition time (organizing and instructing the skill practices) was reduced by an average of 13.2% following intervention, and the involvement of the supporting child, used a great deal in the baseline lessons, was reduced in the intervention phase.
The intervention was significant as it produced, on average, an increase of 7 minutes 29 seconds in the time students practised the criterion task in each lesson. Increases in ALT-PE occurred at the expense of non-productive time within a lesson where children were not engaged with the learning of the criterion task.
I certify that this thesis does not incorporate, without acknowledgement, any material previously submitted for a degree or diploma in any institution of higher education and that, to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where due reference is made in the text.

R. Walker
CHAPTER 1

INTRODUCTION
A major aim of the physical education teacher is to improve the skill level of
students. One way to increase the skill level is to increase the amount of time
that the students are engaged specifically on the task to be learned while they are
experiencing a high rate of success (Phillips & Carlisle, 1983b).

As with all learning, the development of physical competence has its foundation in
the primary years. Maximum advantage needs to be taken of each learning
opportunity. Teachers in the primary school are first and foremost trained as
generalist teachers. Whilst being familiar with the importance of lowering
management and instructional time and maximising activity time, the teacher in
the primary school will have received less training in the awareness of the quality
of performance during practice time.

The concepts 'providing opportunity to learn' and 'time on task' are some of the
strongest supported concepts of effective teaching (Grant, 1983). Other criteria
include class climate, management and instructional behaviours, the quality of skill
practices and the teacher's knowledge of the content. These factors can mean the
difference between a more or less effective teacher.

During a lesson students should be physically active for the major part of the
session. Some organizational procedures used by physical education teachers,
however, result in a loss of activity time. Management, instructional procedures and the skill practices adopted by many teachers result in a small percentage of time in the lesson when each child is actually performing the skill. Factors such as moving the students to and from the oval, organizing and distributing equipment and allocating children to teams all consume a teacher’s ‘effective teaching’ time.

‘Effective teaching’ is difficult to define. Barry and King (1988) stated that difficulties emerge as educators differ in terms of what constitutes effective teaching.

There are some people who think of effectiveness of teaching largely in terms of pupil success in end-of-course examinations. Other people set it mainly in terms of quality of pupil performance in such school work as creativity, diversity of thinking styles, problem solving and so on. Effective teaching is also viewed by some in terms of preparing pupils for life, especially in decision making, understanding, and coping with the vagaries of modern society. Some kind of balance of these positions probably represents the majority view (p.213).

When investigating effective teaching in physical education lessons, an important variable to consider is the involvement of the students. Student involvement in the subject matter is at the centre of much teacher effectiveness research. It appears that the time engaged in learning is significant to skill development. Therefore, the teacher may increase student achievement as he or she has an influence on a student’s involvement in a lesson.

One variable over which the teacher has control is instructional time. The teacher can affect the amount and quality of the students’ time that is engaged in learning. Phillips & Carlisle (1983b, p. 66) stated that "...the engaged skill learning time is the single most important criterion in the determination of an effective
physical education teacher". An investigation into ways in which students spend time during the lesson may therefore be of value when attempting to improve the teaching-learning process. This is supported by a trend in recent physical education research in which a teacher's effectiveness is investigated by his or her use of students' learning time. Grant (1983) stated that a high priority for physical education teachers is to ensure that student involvement is optimal.

When examining a physical education lesson to investigate effective use of learning time, Smyth (cited in Grant, 1983, p.10) defined three major components for study:

1. Allocated time - the amount of time a student has available to work.
2. Engaged time - the percentage of the allocated time that the student is actively involved, and
3. Success rate - the amount of time participating in high, medium and/or low level of success activities. This is often referred to as Academic Learning Time (ALT).

ALT examines the relationship between what teachers are doing and the amount of time students spend on learning. The ALT model was originally developed to study aspects of teacher effectiveness in general curriculum areas. In the classroom ALT has correlated highly with student achievement.

One perspective of the effective teaching definition previously quoted from Barry and King (1988) described effectiveness of teaching largely in terms of student success in end-of-course examinations. The lack of permanent products (such as spelling and mathematics test results) in physical education has led to the adoption of ALT as a proxy for student achievement (Parker & O'Sullivan, 1983).
Over the past decade researchers have developed the ALT model to assist in the study of teacher effectiveness in physical education.

The amount of time a student is engaged in learning a skill at the appropriate level of difficulty in physical education is referred to as Academic Learning Time - Physical Education (ALT-PE). This has resulted from research revealing that, "The more time spent in motor activity related to the subject matter, the more learning that occurs" (Parker & O'Sullivan, 1983, p. 8).

Researchers have expressed confidence when utilizing the concept of ALT in physical education. Borg (cited by Siedentop et al. 1982, p.5) claimed that:

When research over the past 36 years show consistent and positive relationships between time on task and achievement, and when we find 16 studies differing in virtually every aspect of design and yet yielding consistent, positive results, we can, in fact, be very confident that the relationships found are real and enduring.

One way to improve the quality of teaching and learning of physical education in schools is to focus on improving ALT-PE. A subjective observation, or indeed an objective measure of active versus non active time, may reveal that students are physically involved for the major part of the lesson. However, does physical involvement imply that learning has occurred? For example, if the skill to be developed is catching, does time spent chasing after a run-away ball or waiting a turn constitute learning? Given that ALT-PE relates specifically to time on task and quality of task, then providing specific feedback about the way students spend time during the lesson should assist the teacher to modify his or her behaviour to increase the amount of ALT-PE.
It is acknowledged that teacher effectiveness is a broad area. Therefore, this study will investigate one variable of teacher effectiveness pertaining to physical education. Effective use of learning time appears to be the most appropriate variable when investigating the effectiveness of physical education teachers. This study will use the construct of ALT-PE to provide feedback to a teacher in order to improve the teaching and learning of physical education.

Purpose of Study

The purpose of the study is to examine the potential for ALT-PE to be considered as an appropriate variable when discussing the improvement of teaching and learning in physical education lessons.

More specifically, the study sets out to establish whether or not it is possible for teachers to undergo a procedure which is designed to increase the amount of ALT in their teaching of physical education. This procedure involves providing feedback to teachers about their use of learning time and the proportion of that time which can be described as ALT-PE.

The Problem

Major Research Question

1. To what extent and in what ways can ALT-PE be increased in the teaching of physical education?
Specific Research Questions

1. How much ALT-PE are students receiving in a normal physical education lesson?

2. Can that teacher increase ALT-PE following intervention?

3. Which teacher behaviours change to allow ALT-PE to increase?

4. Do lessons that contain higher ALT-PE differ in structure to lessons with low ALT-PE?

5. How significant are any ALT-PE increases received by the children?

Conceptual Framework

The conceptual framework for the study, as presented diagrammatically in Figure 1, has been developed on the assumption that certain teacher behaviours may need to change in order to produce an increase in academic learning time.

The series of lessons used in this study will enable the teacher to repeat similar lessons with improved strategies. Observations will endeavour to locate problems, seek to solve them and highlight the positive aspects of the teacher's performance. The teacher can then incorporate the feedback in following lessons, to increase ALT-PE in this cyclical model.
Definitions of Terms

The following terms have been adapted from Siedentop et al. (1982) and Wilkinson & Taggart (1989).

Allocated Time: The time a teacher allocates for instruction and practice in a particular subject matter area.

Engaged Time: The portion of time during which a student is actually involved with the subject matter.

Academic Learning Time (ALT): The time a student spends appropriately engaged with content at the appropriate level of difficulty.
Academic Learning Time – Physical Education (ALT-PE): The portion of engaged time when a student is involved in practice appropriate to his or her ability.

General Context: The nonacademic focus of the class or individual. It includes waiting, transition and management.

Waiting: The period when the student is waiting for the next turn or time after transition or management.

Transition: The time students spend listening to or performing organizational activities related to instruction such as team selection, changing equipment, moving from one space to another, and changing activities within a lesson.

Management: Time devoted to class business that is unrelated to instructional activity such as taking attendance, discussing a field trip and collecting money.

Activity: The time that a student is appropriately engaged in a subject motor activity. This includes warm-up, skills practice, games, fitness and supporting activities.

Skill Practice: Direct participation in drills and other activities in which the primary goal is individual skill development.

Motor Engaged: This category describes the nature of the target student’s involvement. It includes appropriate, supporting and other motor activity.
Motor Appropriate: Performing the desired skills of the lesson.

Supporting: The student is engaged in subject matter motor activity the purpose of which is to assist others to learn or perform the activity such as feeding balls and spotting in gymnastics.

Social Behaviour: Activities in which social behaviours and attitudes are the focus.

Cognitive: Involvement related to instruction, such as listening, questioning and verbal responding.

Knowledge: Knowledge about skills, fitness, background information, strategies, and tactics. This includes instruction and demonstration.

Off Task: When the student is inappropriately disengaged from the practice, including socializing, daydreaming, misbehaving, and failing to respond when given the opportunity.

Significance of Study

One of the indicators of teacher effectiveness which has been found to correlate with student achievement is the variable of ALT (Godbout, Brunelle & Tousignant, 1983; Graham, Soares & Harrington, 1983; Harrison, 1987; Phillips & Carlisle, 1983a; Placek & Randall, 1986; Silverman, 1985). These researchers have shown a correlation between the amount of time students are practising motor skills at the appropriate level of difficulty (ALT-PE) and achievement.
The teacher behaviour affects student behaviour, and student's behaviour (what the student does during class time) is directly related to student achievement (Lee & Poto, 1988, p. 63).

Studies in this area have compared ALT-PE without limiting the age of the children (Silverman, 1985) or the type of sport (Grant, 1983). Other studies range from analysis of preservice teachers (Randall & Immold, 1989) to observing children in laboratory settings (Paese, 1987). This study will concentrate on increasing the ALT-PE of one teacher over a series of six lessons. The lessons incorporate the skills associated with mini-tennis. All the lessons are conducted with children from Year 6 during normal physical education time.

Figure 2 illustrates how student achievement may be affected by the amount of ALT-PE, which in turn may be determined by the practices utilized by the teacher. Teacher behaviour that produces high ALT-PE may result in greater student achievement (Lee & Poto, 1988; Phillips & Carlisle, 1983a).

![Diagram of Teacher Behaviours and Student Achievement](image)

Figure 2. The affect of ALT on student achievement

The significance of the study is also reflected in the researcher's combination of two observational instruments. The study differs from similar ALT-PE studies as
it combines the ALT-PE/SPORT observation instrument with an anecdotal record system to gain information about ALT-PE. Data will be collected on the following key behaviours:

- Management
- Transition
- Knowledge
- Activity
- Waiting
- Off Task.

This enables the observer to not only obtain percentage statistics of class time, but also comments about the type of teacher behaviours exhibited.

Through the feedback given, the effectiveness of the teacher as measured by the ALT-PE/SPORT instrument should increase, resulting in the students being more active during the physical education lessons.

**Summary**

This chapter provided an introduction to the rationale for the purpose of the study. Questions to be addressed were enumerated, and the limitations and special terms were delineated.

Chapter 2 will review the literature pertaining to the study. This will be followed by specific details relating to the methods and procedures utilized. Analysis and discussion of the data will be followed by a summary and conclusions of the research.
CHAPTER 2

REVIEW OF LITERATURE
CHAPTER 2

REVIEW OF LITERATURE

One of the major goals of physical educators is to improve the learners ability to acquire motor skills. On examining teachers at work it may be found that certain individuals are more effective in achieving this goal than others. An understanding of the common characteristics of effective teachers, how this effectiveness can be measured, and the appropriate methods of assisting teachers to increase their capabilities would provide a significant insight into methods of facilitating improvement in the teaching of physical education.

The following review of literature examines each of the above aspects in turn. The review is therefore presented in three sections:

Section 1 Teacher Effectiveness
Section 2 Measuring Effectiveness
Section 3 Intervention on Teacher Behaviour

Section 1 - Teacher Effectiveness

The study is set within the context of teacher effectiveness. Of the many aspects of teacher effectiveness reported in the literature, this study focuses on a teacher’s use of time, particularly in regard to management skills, instructional strategies and student characteristics. These three aspects appear to be the most salient in regard to the broad area of teacher effectiveness in physical education. However,
it is acknowledged that whilst these might be the most appropriate for teacher effectiveness in physical education, there may be different aspects to be considered when researching teacher effectiveness in other subject areas.

Research has shown that students of more effective teachers in physical education spend more time engaged in activity. Graham et al. (1983) suggested one powerful indicator of teacher effectiveness is the way in which the teacher directs and utilizes time. That is, the amount a student can learn is determined largely by the amount of opportunity given to learn.

Over the past 15 years researchers have begun linking teacher behaviours to student outcomes. This has become known as the process–product paradigm. Teacher behaviours are observable (and alterable) so their presence or absence can be documented objectively by a supervisor (Mireau, 1985).

When studying teacher effectiveness in physical education, there is a need to examine student behaviour. The time a student spends appropriately engaged with the content rather than the time allocated to academic work defines ALT. "ALT is the biggest single instructional variable for predicting student achievement" (Siedentop et al., 1986, p. 267).

The ALT construct used in the classroom has been developed for physical education (ALT-PE). "ALT-PE measures the length of time individual students actually work with physical education content at an appropriate level of difficulty." (Siedentop et al. 1986, p. 268).

The development of ALT-PE has produced some implications for physical education. Siedentop et al. (1986) stated how ALT-PE is a valuable variable in
determining the effectiveness of instruction. However, Siedentop et al. (1986) mentioned that:

*Because it is possible to provide a highly active environment with no qualitative instruction, ALT-PE cannot be used exclusively to determine teacher effectiveness* (p. 268).

In regard to physical education, Metzler (1986) pointed out that many physical educators work under conditions that limit realistic opportunities for student learning:

*Extremely large classes of students with a wide range of skill abilities and physical maturation levels, too little time allocated for teaching, irregular scheduling patterns, use of nonspecialists in many elementary schools, a benign neglect by administrators, a lack of accountability systems for grading (mostly the teacher's fault), and a generally low position on the list of school priorities, comprise the reality for many physical educators today. To hold teachers accountable for student achievement under such conditions is simply unfair* (p. 32).

However, although Metzler lists many factors hindering physical education teachers, teachers should make every attempt to maximise student skill development.

Teacher behaviour has been cited as one of the mediating variables that can affect the amount of learning time for students and subsequently student learning (Grant, 1983). A teacher's effectiveness may be categorized and examined in terms of management and instructional skills, as well as an awareness of the characteristics of students. These categories will be reviewed independently in an attempt to identify more specific factors which may contribute to maximum engaged time, that is, the amount of time students are involved with the subject content.
Management

Management, according to Siedentop et al. (1986, p. 270) is defined as the "ability of the teacher to organize learning environments and maintain appropriate behaviour". Siedentop et al. (1986) also suggested that developing efficient organization procedures may have the potential to decrease management time.

Keeping students profitably engaged in appropriate activities seems the best form for preventing problems.

...successful classroom management involves not merely responding effectively when problems occur, but preventing problems from occurring in the first place (Brophy, 1983, p. 266).

Kounin (cited in Brophy, 1983) found that good classroom managers did not differ a great deal from poor ones when responding to student misconduct. Effective classroom managers minimized the frequency with which students became disruptive in the first place.

To maximize the time a student spends engaged in the task also maximizes the student's opportunity to learn, and this is exhibited in superior performance on achievement tests (Brophy, 1983).

A successful learning environment reveals organization and planning. Arlin (cited in Brophy 1983, p. 266) claimed that:

Transitions between activities are accomplished effectively following a brief signal or a few directions from the teacher, and students seem to know where they are supposed to be, what they are supposed to do, and what equipment they need.
Research into teacher effectiveness assumes that teachers of physical education want to increase the amount of time in which students are engaged in motor activity (Siedentop et al. 1986).

Several studies have distinguished between more and less effective teachers by assessing the amount of time students spend on task. Peiron’s research (cited in Graham et al. 1983) measured time spent engaged in motor activity. This distinguished between more and less effective teachers. Effective teachers provided up to 22% of the time practising the criterion task whilst ineffective teachers spent as little as 7.7%. This suggests that the time spent practising a skill needs to be obtained in order to determine a teacher’s effectiveness. Godbout et al. (1983) in their study found that students were engaged, on average, for only half of the physical education content time (the time in specific physical education activity such as games, knowledge and social behaviour). The rest of the time was spent waiting to get involved. The results of the study suggest a need for better management of student activities.

In a study comparing most and least effective teachers, Phillips and Carlisle (1983a) found the most effective teacher/s spent less time in overall management such as beginning class, organization and behavioural feedback. As a result they provided more than twice the amount of engaged skill learning time and success time when compared with the least effective teachers. Engaged learning time was defined as the amount of time the student was directly learning or practising the skill. The results of this study supported the premise that engaged skill learning time is one of the most important criterion for determining an effective teacher. Additional research by Placek and Randall (1986) indicated a range of 65% to 81% of the lesson was given to physical education content. Students spend the
remainder of the lesson in management activities, waiting to get involved or in transitions.

Therefore, the opinion of the authors cited would suggest that efficient management procedures may result in the opportunity for increased learning time. The specific management skills which set the conditions for learning have also been highlighted by Sledentop et al. (1986) and Brophy (1983). The implications of the studies reviewed suggest that the amount of engaged time is an important variable when evaluating teacher effectiveness. The following section will review instructional skills as they relate to teacher effectiveness.

Instruction

Management has been reviewed separately from instruction, however, instruction is involved in management. The literature pertaining to instruction will be divided into two sections, which will examine the quantity and the quality of academic instruction.

Quantity Instruction

There are many factors that influence the quantity of academic instruction that students receive from the teacher. The amount that a student will learn is determined in part by opportunity to learn or the student's exposure to content. Brophy (1988) stated that a student's opportunity to learn is determined by the degree to which teachers:
1. Are business like and task orientated, emphasize instruction as basic to their role, expect students to master the curriculum and allocate most classroom times to activities with academic objectives rather than to activities with other objectives or no clear objectives at all.

2. Pace the students briskly through the curriculum, but also see that they make continuous progress all along the way, moving through small steps with high or at least moderate rates of success and minimum confusion or frustration.

3. Not only make frequent presentations and demonstrations but do so in ways that include sufficient enthusiasm of delivery, clarity and specificity of language, logical sequencing of content in ways that help students recognize it as an integrated whole and appreciate the relationship among its parts.

4. Circulate to provide supervision and help to students as they work on assignments that are challenging enough to constitute meaningful learning experiences yet easy enough to allow students to attain high levels of success if they put forth reasonable effort, and make sure that those who still need help know when and how to get it (p.4).

Quality Instruction

In addition to the findings concerning the quantity of instruction, the quality of instruction is also important. In an attempt to improve the quality of instruction various criteria will be reviewed.

Kennedy and Land (cited in Siedentop et al. 1986) identified teacher clarity as being important in quality instruction. The outdoor setting for physical education makes teacher clarity essential. Kennedy and Land listed behaviours that improve teacher clarity. Namely the teacher needs to:

1. Give explanations that students understand.

2. Teach step by step.
3. *Give specific details.*

4. *Describe the work to be done and how to do it.*

5. *Work examples and explain them.*


7. *Prepare students for what they will be doing next (p.279).*

Siedentop (1976) suggested the following pertinent details when a teacher is attempting to improve presentation skills such as clarity. The teacher must avoid presenting too much information. Students will not sort out the most important and relevant aspects of the presentation. There is a need to limit the amount of information given at one time. The language a teacher uses should be appropriate to the age and skill level of the students. The final suggestion by Siedentop (1976) is that clear communication will result if information is presented at a speed that allows the students to process the material.

Brophy (1988) reported findings concerning the quality of instruction, stating that achievement gains will increase when the teachers:

a. *not only make frequent presentations and demonstrations but to do so in ways that include sufficient enthusiasm of delivery, clarity and specificity of language, logical sequencing of content, and structuring of the content in ways that help students recognize it as an integrated whole and appreciate the relationships among its parts (through advanced organizers, outlining, signaling of transitions, calling attention to main ideas and summarizing;*

b. *ask clear questions at appropriate levels of difficulty (so that most students can understand and respond adequately to them) and allow students sufficient time to process and begin to formulate answers before calling on one of them to respond;*
c. provide clear and informative feedback to student answers;

d. seek to elicit improved responses when students answer incorrectly or fail to answer at all;

e. answer or redirect relevant student questions and incorporate relevant student comments into the lesson;

f. prepare students for follow-up assignments by reviewing the instructions and working through practice examples with them until they are clear about what to do and how to do it;

g. circulate to provide supervision and help to students as they work on assignments (or if this is not possible, make sure that assignments are challenging enough to constitute meaningful learning experiences yet easy enough to allow students to attain high levels of success if they put forth a reasonable effort, and make sure that those who still need help know when and how to get it) (p.4).

When designing instructional tasks, Barry and King (1988) emphasized the need for teachers to set tasks resulting in 80% success rate. The task is then considered to be within the pupils' range of challenge. To provide students with meaningful learning experiences within a pupil's range of challenge suggests that the quantity of engaged time also requires a degree of quality.

A study conducted by Ratcliffe (1986) demonstrated that intervention by the school principal successfully increased the amount of activity time provided by the physical education teachers. However, the principals expressed concern as to the quality of the engaged time and suggested a need to:

...go beyond increasing total student activity time and focus more on quality of engagement. They questioned the purpose and appropriateness of some activities but did not feel capable of suggesting better activities to their teachers. They expressed a desire to know more about activities that are appropriate for children and that are high in activity time and low in management time (p. 124).
Placek and Randell (1986) stated that teachers needed to do more than just reduce the number of students waiting in line for a turn. They needed, also, to analyse the structure of games and drills and modify them to produce more opportunities for purposeful student response.

In an attempt to increase gains in student achievement, teachers need to keep students in contact with the content. A variety of behaviours for quantity and quality instruction have been reviewed. Effective management and instruction will keep students on task and engaged in appropriate activity.

**Student Characteristics**

In addition to the management and instructional skills of the teacher, the characteristics of the students is an important consideration in determining an effective teaching-learning environment.

Silverman (1985) found that highly skilled students learned in different ways from moderate and low performers. Silverman recognized the importance of teaching methods on students with different characteristics and discussed the need for different instructional procedures.

Past experience or prior knowledge should also be an important consideration. Silverman (1985) focussed on the relationship of student characteristics to academic learning time. He concluded that the characteristics of students were important in the teaching and learning of physical education. For example, Silverman (1985) stated how less skilled students may require more time practising fundamentals of the skill before they would benefit from explanations concerning the finer points of the skill.
The teacher can also have an influence on the students' attitude and performance in physical education. An effective teacher has high expectations. Harrison (1987, p. 38) stated that:

*If you treat individuals as they are, they will stay as they are. But if you treat them as if they were what they could and ought be, they will become what they ought to be.*

This expectancy effect deals with the relationship between teacher expectations for students, the characteristics of the student, and the achievement of the student.

Siedentop et al. (1986, p. 273) stated that, "...what teachers expect students to achieve is largely determined by their perception of how hard students try". An effective teacher, therefore, needs to adopt instruction and skill practices to match student abilities with the difficulty level of the task. Effective teachers will also communicate the belief that their students are capable of success.

Summary

Section 1 has examined specific aspects of teacher effectiveness. Research has indicated that teacher behaviour is indirectly associated with student achievement; teacher behaviour affects student behaviour and student behaviour is directly related to student achievement. For a teacher's effectiveness to improve, the teacher may need to increase the students' exposure to content, that is, the skill being taught. Aspects such as the teacher's management of the class, instructional skills and the nature of the students will influence teacher effectiveness. In addition to the quantity of time that students are engaged in learning, certain qualities of that engaged time have also been found to be significant in student learning.
In order to examine student engaged time more specifically, models for assessing academic learning time have been developed. The following section will examine academic learning time and review instruments and methods for measuring teacher effectiveness.

Section 2 – Measuring Teacher Effectiveness

The literature reviewed in Section 1 highlighted certain teacher and student behaviours in general which may contribute to promoting higher achievement. However, in the past, researchers dealing specifically with teacher effectiveness in physical education have tended towards investigating opportunity for the student to respond, rather than investigating successful involvement when evaluating the concept of learning in physical education classes.

The integration of the goals of science and education as they relate to single subject designs in classroom based research need to be defined. Tawney & Gast (1984) stated that the goal of science "...is to advance knowledge" (p.67), whereas the goal of education is "...to change behaviour in a positive direction" (p.67).

Tawney & Gast (1984) stated that it is possible to incorporate scientific methodology into the classroom environment. One method would be to apply a systematic procedure on an aspect of child–environment interactions. Behaviour change is possible following carefully planned and sequenced interventions (Tawney & Gast, 1984). One systematic procedure from which to measure behaviour change is ALT.
Academic Learning Time

This subsection examines the concept of time within a lesson with effective teaching. The four terms pertaining to time, namely allocated time, pupil attention, success rate and academic learning time will be discussed.

Allocated time is the amount of time a teacher allocates to the subject in a lesson. Once an amount of time has been allocated other factors ought to be considered. Pupil attention, referred to as time on task or engaged time, is the portion of allocated time that a student is actually involved in the subject matter. Barry and King (1988, p. 296) stated that:

...pupils who have a higher level of time on task or engaged time tend to achieve higher than pupils who have lower levels of time-on-task or engaged time.

During engaged time or time-on-task, the pupil needs to experience a high meaningful success rate. Barry and King (1988), stressed the importance of structuring tasks so that pupils can experience success.

...this factor of meaningful success rate while on task during time spent on a subject area is a critical factor in the quality of learning. In other words, we need to go beyond engaged time to incorporate the idea of meaningful success rate (p.298).

Barry and King (1988) showed diagrammatically the three factors of allocated time, pupil attention and success rate (Figure 3). They use the intersection of the three circles to represent academic learning time. Academic learning time represents the portion of pupil attention time (engaged time) when the student is involved at a level appropriate to his or her abilities resulting in a high success rate.
*Teachers can assume fairly safely that where pupils are working on tasks within the pupils’ range of challenge (easy and challenging work within the pupils’ reach) then teachers have gone a long way to ensuring effective teaching* (p. 299).

![Venn diagram showing the relationship between allocated time, pupil attention, success rate, and academic learning time.](image)

**Figure 3.** Factors that combine to form the amount of Academic Learning Time. (Adapted from Barry and King, 1988, p. 299)

Academic learning time is the amount of time children spend actively participating in an activity at the appropriate level of difficulty. ALT uses the process - product paradigm in teacher effectiveness (linking learner activities to student achievement). It differs from the process - product paradigm slightly as it recognizes that student activity, in the form of ALT, stands between the teacher’s activities and student achievement. ALT developed from the Beginning Teacher Evaluation Studies (BTES) which established a strong relationship between student achievement and the amount of time that a student spent engaged in a task at an easy difficulty level (Siedentop et al. 1986).
A model called the ALT-PE has been developed specifically for physical education. ALT-PE considers both the setting of the material and learners' involvement. Developed by Siedentop (1979), the model demonstrates the link between teacher behaviour and student achievement. The model assumes that improvement in the ALT variable is related to improved performance (Godbout et al. 1983).

Siedentop et al. (1986) use ALT in physical education to measure:

...the length of time individual students actually work with physical education content at an appropriate level of difficulty. Appropriate level of difficulty is defined as a level with a high success rate. It is based on classroom findings that high success rate is a significant factor in determining appropriateness (p. 268).

Siedentop et al. (1986), in their support for the ALT-PE model, suggested that it was logical to assume that the amount of time students have to practice the skill at the appropriate difficulty level, the stronger the prediction of achievement.

A difference of opinion occurs in selecting the most valid method of evaluating teacher effectiveness. Berliner (cited in Siedentop 1983a, p. 4) argued that ALT-PE allows one to assess learning as it occurs rather than having to wait until the end of a unit or a school year. Siedentop (1983a) in contrast claimed that achievement should not only be a score on a test as there are many variables which may influence the result. Amongst these are the content validity and the correlation with entry skill to final achievement. Siedentop (1983a) concluded that:

ALT will continue to serve as a thoroughly legitimate criterion variable for assessing teacher effectiveness; that is, the teachers who produce higher levels of ALT-PE will be more effective teachers (p. 5).
Fisher (cited in Lee and Poto, 1988, p. 65) confirmed that "ALT was a valid substitute measure for achievement test scores." Their study found engaged time at a lower success rate was negatively associated with achievement. This suggests that teachers need to ensure that engaged tasks are at an appropriate level of difficulty.

While the value of assessing teacher effectiveness is undisputed, the method of gathering data often differs. The next part of Section 2 will review ways of measuring ALT-PE.

Systematic Observation Methods

Metzler (1986) believed analysing physical education teaching had a great advantage over analysing the classroom teaching learning process:

The most critical process behaviours of students as they engage in physical education activities are overt and measurable. This is not the case in the classroom where an observer must often make high inference decisions about student engagement. The overt practice can then easily be observed, measured and related to known instructional outcomes to determine process effectiveness (p. 30).

A systematic observation system provides objective information on the instructional process. Data can be analysed to determine the appropriateness of instructional events observed. Siedentop et al. (1986) acknowledged that determining the appropriateness of behaviour and recommending change was the most difficult analytic skill to develop. Siedentop et al. (1986) illustrated this using the following example:
Assume that a teacher analyses a lesson and determines that students are actually getting to practice skills only 30% of the time. First the teacher has to decide whether this is appropriate and, if not, why such practice time is occurring. Possible problems may be instructional arrangements, management time, or too much time spent lecturing (p. 286).

While teaching, it is difficult to be aware of what is going on around you. Teachers can benefit by having others look at their teaching in an objective way. Teachers endeavouring to improve instructional skills or solve instructional problems will benefit in the long term using systematic observation procedure. (p. 287)

The initial method of measuring ALT in physical education is the ALT-PE system. A brief description of this method will be given as it forms the foundation of the more recently developed ALT-PE/SPORT Instrument.

1. The ALT-PE System

The ALT-PE is a hierarchic decision-making system. The system is required to systematically observe the following steps:

Step 1: The first step provides information concerning the context within which the student behaviour is occurring. Is the class involved in general content or in subject content matter?

Step 2: If the class is involved in subject matter content then the observer needs to refine this category further into either knowledge or motor content.

Table 1 details the context level proposed by Siedentop et al. (1982, p.8).
### TABLE 1
**CONTEXT LEVEL**

<table>
<thead>
<tr>
<th>General Content</th>
<th>Subject Matter</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transition</td>
<td>Knowledge</td>
<td>Motor</td>
</tr>
<tr>
<td>Management</td>
<td>Technique</td>
<td>Practice</td>
</tr>
<tr>
<td>Break</td>
<td>Strategy</td>
<td>Game</td>
</tr>
<tr>
<td>Warm-Up</td>
<td>Rules</td>
<td>Fitness</td>
</tr>
<tr>
<td></td>
<td>Social Behaviour</td>
<td></td>
</tr>
</tbody>
</table>

Step 3: At this point, observation shifts from the whole class to individual learner involvement. It requires separate judgements for each student included in the observation sample. The learner involvement level has two categories, nonmotor engaged and motor engaged. The term motor, when used in the learner involvement categories, refers to motor involvement with activities related to the goals of the setting (Siedentop et al. 1982).

Godbout et al. (1983) emphasized student success rate as an important variable when using ALT-PE time. Engaged time was broken into three areas; succeeds easily, succeeds with difficulty and nonsuccess. Attempts at the skill that were categorized as nonsuccess were not included when establishing the percentage of ALT-PE for a lesson.
Table 2 details the learner involvement categories proposed by Siedentop et al. (1982, p.9).

<table>
<thead>
<tr>
<th>Not Motor Engaged</th>
<th>Motor Engaged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interim</td>
<td>Motor Appropriate</td>
</tr>
<tr>
<td>Waiting</td>
<td>Motor Inappropriate</td>
</tr>
<tr>
<td>Off Task</td>
<td></td>
</tr>
<tr>
<td>On Task</td>
<td></td>
</tr>
<tr>
<td>Cognitive</td>
<td></td>
</tr>
</tbody>
</table>

2. The ALT-PE/SPORT Observation Instrument

The ALT-PE/SPORT instrument follows a similar data based approach to the ALT-PE system. This updated instrument provides an objective means for the recorder to interact with the teacher when discussing observations made during teaching (Wilkinson & Taggart, 1989).

For people to provide useful supervisory information, they must observe teaching effects systematically; that is, they must look at teaching through the lenses of an observational system (p.8).

The instrument identifies the activities of individual pupils in physical education classes using interval recording. Like other ALT instruments, it measures effective teaching by what the pupils do in the class (Wilkinson & Taggart, 1989).
The 6 key behaviours for observation are:

- Management
- Transition
- Knowledge
- Activity
- Waiting
- Off Task.

The teacher receives feedback about progress toward goals. Data collected through note taking is unlikely to be powerful enough to account for improvement.

The ALT-PE/SPORT instrument differs from the ALT-PE system in that it is not as complex. Only one decision is needed for each observation. The ALT/PE SPORT instrument uses broad categories and does not give the recorder the chance to record any details about the key behaviour observed.

When examining a learning environment the observer may wish to gain information about a specific moment or a period of time within a lesson. The ALT-PE/SPORT instrument provides the opportunity to utilize both interval and duration recording techniques.

Variables in Assessment

An important issue in ALT-PE research is whether to include student cognitive activities as well as physical activities in the engaged time. Motor engaged time is considered a student's best opportunity to learn. Students cannot be expected to
learn unless they are practising appropriate movements. A certain amount of
cognitive learning, however, can enhance motor success (Lee & Poto, 1988; Metzler, 1983). On a theoretical level, Lee & Poto (1988, p. 68) implied that students "...cannot be expected to improve unless they practise executing appropriate movements, but accumulating cognitive knowledge concerning the skill is an integral part of skill acquisition especially in the early stages" (p.68).

Silverman (1985) treated all types of motor and cognitive engagement as equal. This could explain why he found engaged time an insufficient measure for achievement.

If a student practised breaststroke by movement on the deck of the pool for 30 seconds and another student practised the entire skill for a length of the pool, which also took 30 seconds, both would be engaged in motor practice for that period. There is a strong reason to believe the two forms of practice are not equally effective in developing motor skill (p. 70).

Silverman's findings were not, however, consistent with the typical findings of research in classrooms. The ease with which students practised the skill was not recorded. This supports the need to record all engagement and the difficulty level of that engagement.

Apart from the lack of distinction between motor and cognitive engagement time, research on ALT in physical education has also covered a variety of learners, teachers and instructional tasks. This makes direct comparison of results difficult.

Studies have produced results for classes of various sizes and ages from laboratory settings to the real situation. Teachers have been forewarned of the lesson to be observed in some instances and not others. Teachers under focus have ranged in experience from postservice teachers to preservice teachers. In addition, the
nature of the skill being taught may have an effect on the amount of ALT-PE produced. For this reason, there is no recommended amount of ALT-PE that a teacher should achieve in a lesson. Teachers should, however, attempt to maximise the amount of ALT-PE in each lesson. Comparisons are difficult because of the varying situations.

In a study carried out by Godbout et al. (1983), 20% motor engagement (ALT) and 14% cognitive engagement were reported. This study compared closely with a study carried out by Placek et al. (1982), which found that all students in the class received an ALT measure between 15% and 24% of class time. Graham et al. (1983) found that students spent 21% of class time practising the criterion task.

One of the factors affecting the validity of ALT-PE between any two studies may be the subjective judgement of the observer when interpreting the lesson. A discrepancy in looking at skill practice in terms of success rate can alter the amount of ALT recorded. For example, Tousignant (cited in Siedentop, 1983a, p. 6) described how some students are clever enough to avoid motor response while still staying within the bounds of the managerial demands of the class. Such students have been labelled "competent bystanders". These students need to be distinguished from students who are legitimately engaged in waiting.

Finally, despite the teacher following all the criteria for teacher effectiveness suggested in this review, a student who has ignored, not listened or decided for some other reason not to carry out the teacher direction will not be credited with ALT-PE on the instrument. This cannot be assessed as an indication of low teacher effectiveness.
Summary

The observation instruments reviewed have been shown to be an accepted way of measuring ALT in physical education. Section 3 examines how a researcher may successfully intervene to assist in modifying a teacher's behaviour to increase ALT in physical education.

Section 3 - Intervention on Teacher Behaviour

Intervention is one way to show teachers how to be more effective and to build on their teaching strengths. One such study in physical education showed how teachers can improve their teaching behaviour if they "understand what is expected, see the behaviour modelled, practice it in a real setting and get accurate feedback about their performance" (Ratcliffe, 1986, p. 117).

To establish whether there is a behaviour change a baseline needs to be obtained. If the behaviour changes following intervention, the greater the probability that intervention was responsible for the change in behaviour. As a result, the A-B design would seem an appropriate format of research.

A-B Design

The A-B design is sometimes referred to as a simple time series design. It represents a basic quasi-experimental single subject design. Two experimental conditions are used: baseline (A) and intervention (B).
After several observations under baseline conditions, and after the data trend and level have stabilized, the intervention is introduced. During intervention the target behaviour continues to be repeated by measured, noted changes in the dependent variable. (Tawney & Gast, 1984, p. 191)

If there is a change in behaviour during intervention, when compared to baseline measures, it is probable that intervention was responsible for that change (Tawney & Gast, 1984).

During the 'A' design the investigator has no plans to intervene or in any way alter the phenomenon under study. Measurement of the 'B' paradigm occurs after an intervention has been introduced.

Tawney & Gast (1984) stated that the "A-B design provides a framework for repeated measurement of a target behaviour during baseline and intervention conditions" (p.194). Such a design allows a researcher to objectively measure behaviour.

Evaluating teacher effectiveness is important in order to develop effective teaching behaviours. An analytic system can provide physical education teachers with relevant, constructive and objective feedback on teacher performance (Metzler, 1986).

A common method used when intervening on a teacher's performance is clinical supervision.
Clinical Supervision

Clinical supervision is defined by Smyth (1984) as the rationale and practice designed to improve a teacher's performance. Data is analysed and procedures and strategies designed to improve the students' learning and improve the teacher's behaviour. The purpose of clinical supervision is:

... to articulate teaching intentions, to observe and collect information about some aspect of teaching, and then to analyse that information for the understanding and meanings it might contain (p. 7).

Clinical supervision has four distinct and purposeful stages. Figure 4 illustrates the four stages of clinical supervision described by Smyth (1984).

1. Preobservation Conference
2. Observation
3. Analysis
4. Postobservation Conference

Figure. 4 – Stages to clinical supervision

The four stages to clinical supervision are:
1. Preobservation Conference

In the preobservation conference, the observer seeks to understand what is to occur in the lesson to be observed. It is important to uncover the objectives of the lesson and the stage the students are at.

2. Observation

During the observation phase the observer collects the necessary information. Entry into the teaching area should be unobtrusive. It is necessary to stay for the whole lesson and to gather as much data as possible.

3. Analysis

During the analysis stage, the observer attempts to make sense of, or attach significance to the behaviours represented in the raw data. Smyth (1984) stated that the role of the observer is to:

...give the teacher an appreciation of a situation from which he or she sometimes find it difficult to distance himself or herself. It is a way of acquiring another perspective (p.9).

It takes time to plan the conference. Comments need to be organized and sequenced. The more time spent on planning the conference the greater the effect on teaching performance (Mireau, 1985).
During the postobservation conference, the observer and the teacher share their interpretations, draw inferences where they can and plan actions for the future based on their discoveries. The observer should:

...work over ... data for what it reveals, asking questions about whether similar or different teaching strategies might be used on future occasions. (Smyth, 1984, p. 9)

Ellard, 1983 (cited in Smyth, 1984, p. 10) addressed the active dimension of clinical supervision. He stated that the process "enables teachers to obtain constructive feedback about the interactive aspects of their teaching along with the perceived impact upon students".

Successful intervention on teacher effectiveness is only likely to take place if relevant and reliable feedback is given to the teacher. The results of a study carried out by Paese (1987) indicated that the feedback given had a positive effect on modifying the teacher's behaviour. Clinical supervision was used to set the teacher clear goals. A baseline of 17% ALT-PE increased to 29% ALT-PE. This represents a 12% increase in ALT-PE following the intervention.

For a teacher to improve his or her effectiveness, feedback is going to be very important. One style of feedback that is prominent in the literature when attempting to improve teacher effectiveness is conferencing.
Conferencing

Mireau (1985) considered that conferencing is the key to improving a teacher’s performance. Teachers that want to improve their ability to enable students to learn will incorporate changes and refinements resulting from self-reflection and through assistance recorded from the observer/conferencer.

When conferencing with a teacher Mireau (1985) suggested that it is important to allow the teacher to examine his or her own effectiveness - one should assist the teacher in examining his or her own performance and determine alternate ways of delivering instruction. To be of greatest value, feedback should be specific and presented as soon as possible. It should focus on observable and alterable variables (Mireau, 1985).

The conference is seen as useful for the reflection of teacher performance. Analysis and feedback are important in improving teacher effectiveness.

Hunter (cited in Mireau, 1985, p. 1-40) outlined six conference types, four of which are used extensively in teacher effectiveness programmes to promote teacher growth. A description of the four types of conferencing follows:

A Type Conference: identifies and labels the teacher’s effective behaviours, giving a rationale for their effectiveness.

B Type Conference: expands on the teacher’s repertoire of skills so he or she will have more options and will not be limited to those versions of skills more frequently used.
C Type Conference: encourages the teacher to identify a skill for practice and improvement and to help develop strategies to reduce and eliminate future unsatisfactory outcomes.

D Type Conference: labels and identifies those less effective aspects of teaching not evident to the teacher and helps the teacher develop alternate procedures which have potential for effectiveness.

Conferencing can help a teacher to structure a lesson in order to obtain a higher ALT-PE level. One such study carried out by Ratcliffe (1986) used school principals as investigators to provide intervention and give accurate feedback about teachers' performance. As a result, the teachers reduced management time and increased student activity time. Suggestions included involving learners in active demonstrations, ensuring that lesson content related to the objectives of a lesson and structuring the task to ensure high success.

The relevance of a task to the desired lesson goal is important in ALT-PE. Metzler (1983) cited the example of basketball where the immediate goal is learning lay-ups; any activity not related to learning that particular skill is regarded as irrelevant. Metzler (1983, p. 18) stated that a simple way to structure a demonstration for high ALT-PE is by "planning active lectures in which students work right along with the model at the same time." The model refers to the person demonstrating the steps to perform a particular skill.

A high success rate within the number of practice trials is significant for achievement in physical education (Silverman, 1985). Since ALT-PE is defined as being engaged at an appropriate difficulty level, assessing the success rate or ease of practice becomes important. Rating the performer on how the skill was...
performed discriminates between the motor responses. Instead of just having quantity the endeavour is to focus more on the quality of response. This is a favourable modification reflected by Parker and O'Sullivan (1983). The researcher is thus provided with a ratio of correct responses to the number of opportunities the student had to respond.

Godbout et al. (1983, p. 16) subtotalled the engaged motor category into "succeeds easily" and "succeeds with more difficulty." An effective teacher will attempt to structure lessons with a maximum amount of practice at the appropriate difficulty level.

Summary

This review has examined many process-product studies which have indicated the relationship between the process variables (what teachers say and do) and product variables (student achievement), suggesting a link between the amount of time that a student is involved in the content and student achievement.

One variable of teacher effectiveness that has been reviewed is academic learning time. Effective teachers have been identified as those providing students with a higher amount of ALT-PE within lessons. The ALT-PE instrument provides one method for measuring teacher effectiveness.

While an ALT-PE instrument will provide a score for ALT and give a percentage breakdown of lesson time, it will not modify a teacher's behaviour. For a teacher to modify his or her behaviour in an attempt to increase the amount of ALT-PE, a style of intervention must happen. The teacher will need guidance through the results gained from the ALT-PE instrument in an effort to make sense of the
data. Clinical supervision and conferencing are useful intervention strategies when providing feedback to a teacher about his or her performance.
CHAPTER 3

METHODOLOGY
CHAPTER 3

METHODOLOGY

Several aspects pertaining to the methodology and procedures will be detailed in this chapter. The specific aspects to be addressed are:

the research design;
the subjects and how they were selected;
the lessons to be observed;
the observation instrument;
reliability and validity;
methods for presenting feedback;
limitations and delimitations.

The chapter will conclude with the ethical considerations for this study.

The Design

A simple time series A-B design was used to investigate the effects of the intervention by the researcher on selected physical education teaching behaviours. Specific teacher behaviours were identified and measured to provide baselines against which changes could be evaluated. Baseline data on the percentage of ALT-PE intervals and transition intervals were collected before beginning the intervention. The intervention consisted of feedback about ALT-PE within lessons and involved clinical supervision.
The Sample

The subjects chosen for the study were 54 students and the physical education specialist from a state primary school. The students were from two Year 6 classes. One class contained 26 students, the other class contained 28 students. This age group was chosen so that ALT-PE for students learning a specific game skill could be measured. All students from Year 6 were involved in the lessons to provide the researcher with two intact classes.

The Selection Process

1. An average student was defined as one who displays both average skill and average behaviour.

2. The students in each class were categorized according to the subjective assessment of their abilities and behaviour by the physical education specialist.

3. The target student was randomly selected from the above group and observed as a representative for the class. This is similar to the selection process of a target student stated by Wilkinson and Taggart (1989) in the ALT-PE/SPORT instruments instructional module.

4. The target student was the student observed and whose behaviours were recorded during the period of observation.
Procedures

For the purpose of this study, mini-tennis was selected as the activity to be taught to the students. This sport was chosen as the students brought little prior knowledge or skill acquisition to the lesson.

1. The teacher was instructed to teach six mini-tennis lessons. It was proposed that the first three lessons would be used for establishing a baseline for ALT-PE and the last three lessons be used to undertake the intervention programme. However, if after the third lesson it was found that the ALT-PE amount was erratic, then the number of lessons necessary to establish an accurate baseline would have been extended.

The teacher was instructed to clearly state the objective(s) prior to the commencement of the lesson. The objectives were particularly important when analysing each lesson on the observation instrument, as they indicated the criterion skills to be practised.

2. Lessons were a minimum of 25 minutes duration and related to a skill(s) associated with mini-tennis. Two classes of Year 6 students were used so that the content the teacher covered over the first three lessons could be repeated. This eliminated the problem of using one class. With one class the intervention stage would have occurred during lesson four, five and six where it was likely to be a game situation. If this was the case, comparisons of ALT-PE between lessons would be difficult due to variations in the nature of the task.

3. The lessons were held once a week for six consecutive weeks.
4. The first three lessons were taken with one Year 6 class. These three lessons were used to establish a baseline for the amount of ALT-PE the teacher was providing in the mini-tennis lessons. There was no intervention or feedback given on the first two lessons. Having established the baseline score for the first three lessons, feedback was given prior to lesson four.

5. The last three lessons were taken with the other Year 6 class. These lessons incorporated intervention on the teacher's performance. The content from the first three lessons remained the same.

Table 3 shows the particular phase of the study in relation to the class and lesson number.

<table>
<thead>
<tr>
<th>Week</th>
<th>Lesson</th>
<th>Class</th>
<th>Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Lesson 1</td>
<td>Class A</td>
<td>Establish baseline</td>
</tr>
<tr>
<td>Week 2</td>
<td>Lesson 2</td>
<td>Class A</td>
<td>Establish baseline</td>
</tr>
<tr>
<td>Week 3</td>
<td>Lesson 3</td>
<td>Class A</td>
<td>Establish baseline/Feedback intervention</td>
</tr>
<tr>
<td>Week 4</td>
<td>Lesson 4</td>
<td>Class B</td>
<td>Feedback intervention</td>
</tr>
<tr>
<td>Week 5</td>
<td>Lesson 5</td>
<td>Class B</td>
<td>Feedback intervention</td>
</tr>
<tr>
<td>Week 6</td>
<td>Lesson 6</td>
<td>Class B</td>
<td>Feedback intervention</td>
</tr>
</tbody>
</table>

Instruments

The original ALT-PE instrument is attached as Appendix 1. The ALT-PE/SPORT instrument developed by Wilkinson & Taggart is
included as Appendix 2 and the final instrument used in this research with modifications from the ALT-PE/SPORT instrument is attached as Appendix 3.

In its original form, the ALT-PE/SPORT instrument has a choice of five key behaviours that can be recorded for a particular time interval. One of these key behaviours is Activity. For the purpose of this research Activity time needed to be broken down into categories. The categories that were developed under Activity time were taken from the original ALT-PE instrument. These adaptations enabled the researcher to obtain an accurate ALT-PE reading for each lesson.

The following subsection describes how the instrument was applied. Details are given on the key behaviours that were observed. Techniques used for establishing reliability and the validity of the ALT-PE/SPORT instrument are outlined.

The ALT-PE/SPORT Instrument

The ALT-PE/SPORT instrument used interval recording to identify what an individual student was doing in physical education. For the first five second interval the target student was observed. In the next five second interval the observer recorded the key behaviour that best represented what he just observed. Consecutive intervals were used to observe and record. There were six observations recorded each minute.

Additional information was gathered by viewing a video recording of each lesson. The video focused only on the target student. The video camera was not fixed in
one spot throughout the lesson and was moved so that teacher instructions could be heard and to enable a clear view of the target student.

The six key behaviours observed have been adapted from the ALT-PE/SPORT instrument's self instructional module (Wilkinson & Taggart, 1989). If there was more than one key behaviour on display during the five second observation time, the key behaviour of greatest duration was recorded.

1. Management Time:

Management time referred to the time that the student spent in organization and nonacademic tasks. It was the time when students were not given the opportunity to learn the subject matter. An example was roll taking or the discussion of a forthcoming school event.

One goal for improved teacher effectiveness is to reduce management time. Recent research data suggests that management time accounts for about 20% of a student's time in physical education classes. While management time is a necessary part of every lesson, it is crucial that efforts are made to minimize it, thereby allowing more time for activity.

2. Transition:

Transition was an aspect of management time. Transitions were managerial episodes within or between activities. A transition resulted when teams changed courts, when students moved from one station to another, or when equipment was changed.
Reducing the length of such managerial episodes improves the efficiency of the physical education class.

3. Knowledge:

Teachers communicate information verbally or nonverbally by lecturing, explaining and demonstrating information about the subject matter. Knowledge was the key behaviour recorded when the student received knowledge from the teacher. The student could also receive knowledge from peers and videos. A student was only recorded as receiving knowledge if he or she was paying attention.

Research data suggests that instruction accounts for 15 to 40% of a student's behaviour, the average being 30%.

Information needs to be imparted in every lesson if the class is to run smoothly and for students to learn. The goal of reducing the amount of information imparted could lead to more effective teaching if more time is allowed for student motor response.

4. Activity:

The important key behaviour was the time students spend in subject matter, i.e. motor engagement. Motor engaged activity referred to practice, drills, fitness, warm ups and spotting. Research suggested students spend approximately 25% of the physical education lesson involved in activity.
If the skill is too difficult, or the students are engaged in the repetitive practice of skills they have already mastered, then they will learn very little. The student's involvement can be too easy, too difficult or at the right level of difficulty.

However, students may not necessarily improve their skill when involved in a game. Just standing on the court or field during a game was not coded activity. The student would have to be tracking the ball or backing up a teammate to be coded as activity.

This study adapted the activity section of the instrument by dividing activity into the following categories:

$A_P$ – Performing the skills which relate to the objectives of the lesson with moderate to high success. This category gave the amount of ALT for a lesson. The activity - performing category was coded if the student attempted the criterion skill during the observe-interval with moderate to high success.

$A/P$ – As for $A_P$, however, the student performed the skill with little or no success.

$A_s$ – Was involved in the activity in a supportive role such as feeding the ball or spotting for a partner.

$A_i$ – Involved in activity, however the activity was not in line with the stated objectives of the lesson. The activity being performed was inappropriate.

$A_w$ – Warm up.
The activity section was adapted significantly from the original instrument as the focus of the study was to measure the amount and quality of ALT in each lesson.

5. Waiting:

The key behaviour of waiting referred to the time in which the student was not involved, but was waiting for the next opportunity to respond during skills practice and games. Waiting accounts for about 30% of student’s time in physical education. The amount of waiting represented the inability of the teacher to keep students involved in the lesson.

Waiting occurred after activity had begun. If the student was standing in line before the activity had commenced, this was coded as Transition.

6. Off Task:

The key behaviour of Off Task referred to the time when a student was not engaged in activity in which he or she should be participating, or was engaged in an activity other than the one in which he or she should have been participating. This included talking while the teacher was instructing, mis-using equipment, or fooling around.

An example of a coded ALT-PE/SPORT sheet can be seen in Appendix 4.

Class Analysis Sheet

A Class Analysis Sheet (Appendix 5) was provided on the reverse side of the observation instrument. The Class Analysis Sheet provided the recorder with the
option of writing anecdotal comments about occurrences within the lesson. The comments were subjective opinions on whether teacher behaviour was effective or appropriate at a particular time. This allowed the observer to record what nonengaged students were doing when appropriate.

The Class Analysis Sheet allowed the recorder the opportunity to recommend ways the teacher could improve his or her effectiveness in an attempt to increase the amount of time students were on task at the appropriate difficulty level. The Class Analysis Sheet provided the teacher with comments on strengths and weaknesses, along with the statistics that the ALT-PE/SPORT instrument provided. Comments were written during the second viewing of the video for each lesson.

The Class Analysis Sheet differed from the ALT-PE/SPORT instrument as it provided feedback pertaining to the whole class in terms of the quality of instruction, management and activity time (Appendix 5).

Reliability of Data Collection

Reliability was established in three areas:

1. A self-observer reliability check.

2. The accuracy of using only one target student.

3. A comparability check on the two Year 6 classes.
As all coding on the ALT-PE/SPORT instrument was conducted by the same person a reliability check was established.

Trial tapes of mini-tennis lessons were coded and recorded and the data compared to establish reliability. Data produced on successive occasions needed to be stable if research questions were to be answered.

The Scored Interval method was used to calculate reliability on the data collected. Reliability was assessed for each variable on the ALT-PE/SPORT instrument that was included in the data presentation.

Scoring for reliability was done as follows:

1. Intervals when observations were the same were identified as scored intervals.

2. Intervals that did not correlate were known as unscored intervals.

3. The amount of scored intervals compared on an interval-by-interval basis determined the number of agreements.

4. The number of agreements and disagreements needed to be placed into a reliability formula to calculate the S.I. percentage for that variable.
Method for calculating reliability:

\[
\text{Agreements} \times \frac{100}{\text{Disagreements} + \text{Agreements}} = \% \text{ of agreements}
\]

A self-reliability check was established to analyse whether the observer recorded the same data when viewing the same lesson twice. The self-observer reliability check resulted in 81.5% accuracy.

A reliability check was established for using one target student. This was thought necessary as any observations were generalized to the whole class. Data was collected on two students, satisfying the criteria for a target student, during a lesson. Results indicated a high level of reliability with an expected generalizability coefficient of 0.94 for ALT-PE results. Both students accumulated similar amounts of average ALT-PE in the lesson. The results are below:

Student A  -  17% ALT

Student B  -  18% ALT

It was assumed that focusing on only one target student gave an accurate representation of the amount of ALT-PE that other students were receiving.

As two Year 6 classes were used in the sample, a subjective check to see how the classes compared was necessary. Both Year 6 classes were located at the same school and were of a similar size. The physical education teacher stated that he
considered both classes to be similar in skill and attitude, however, it is acknowledged that the comparability level is at best superficial. Students were randomly allocated to the classes at the end of the previous year.

Validity

To eliminate the potential to prejudice the data, procedures were taken in training. Prior to the collection of data the observer spent six hours using the instructional module manual for the ALT-PE/SPORT instrument developed by Wilkinson and Taggart (1989). An inter-observer agreement was computed with a master coder from a local university. A comparison of the number of units on which the observers did agree, to the total number of units involved in a given observation session was made, this resulted in an agreement of 86%.

This study used repeated measures of data on the same individual teacher. Time series analysis reflected a valid test of change in the level and slope of an individual's performance. This gave the researcher confidence to distinguish between random fluctuations and true intervention effects (Schutz & Goodman, 1982). Three aspects of internal validity were considered in this study where intervention on ALT-PE was observed. These factors were: level, baseline and trend. A description of these three factors follows.

1. **Level**

Preintervention behaviour was obtained to establish a baseline phase. Three lessons on mini-tennis with a Year 6 class were carried out. As the measured behaviour exhibited stability throughout the baseline phases, abrupt changes in
behaviour following intervention were apparent. However, if there was an increasing or decreasing trend in the data when trying to establish a baseline phase, then detection of change in level would have not been easily achieved (Schutz & Goodman, 1982).

2. Baseline

The validity of any inferences regarding the magnitude and reliability of a change in data set is the estimate of the preintervention level of performance.

*The baseline phase must be sufficiently long to permit an accurate estimate of this preintervention performance* (Schutz & Goodman, 1982, p. 42).

If there was not a steady trend in the data in the baseline phase after three lessons, then the phase would have been extended until a stable baseline was obtained.

3. Trend

A comparison of the trend, or rate of change in the behaviour before and after the intervention, was needed.

*If preintervention performance was showing a gradual linear trend reflecting an improvement in behaviour, then one would wish to test for the presence of a change in this trend (an increase or decrease in the slope) following the intervention. A mere continuation of the trend, while resulting in a difference in mean performance for pre and post intervention, would not be cause to conclude that intervention had an effect* (Schutz & Goodman, 1982, p. 42).
After gaining a baseline for ALT-PE provided by the teacher in mini-tennis in the first three lessons using a class of similar age, intervention began. The desired goal was an increase in ALT-PE following intervention.

Presentation of Feedback

The ALT-PE SPORT instrument determined the amount of time devoted to each category. Due to variations in the number of observational periods in each lesson, absolute time values were converted to a percentage of the observational period. As each observation unit was of 5 second duration, calculations were completed on the number of observation units, rather than number of seconds. The total number of observation units involved in a 25 minute lesson was 150 (6 per minute x 25).

The final count for each category, over the total number of observation intervals, multiplied by 100, yielded a percentage of class time devoted to a category. Variable percentages were also subtotalled for each category.

If ALT-PE is to increase, then feedback related to the individual teacher's performance is of great importance. Feedback was specific and presented as soon as possible.

Academic learning time (performing the motor task with success), the main dependant variable of the study, was expressed in terms of a percentage of class period. Thus, each of the lessons produced final ALT-PE scores.
The target student was viewed on alternate five second intervals to endeavour to keep results stable. The target student represented the whole class.

Clinical supervision was used to form the core of feedback. Lessons were observed and coded by the researcher. Data was obtained and presented to the teacher. In an attempt to produce successful intervention on the teacher behaviours, the following stages were used.

1. **Pre Observation Conference**

Discussion took place with the teacher on the objectives of the lesson.

2. **Analysis**

Information gained from each lesson was presented meaningfully to the teacher so the desired increase in ALT-PE could be made. Presentation of tables and figures were used to show the percentage of time devoted to various behaviours. The amount of ALT-PE and its importance to learning was pointed out in each conference.

Information that the observer gathered from each lesson was presented within two days of each lesson. The teacher required guidance in understanding any existing problems. This gave the teacher five days to reflect upon observations made and replan to improve his effectiveness in the following lesson.

Anecdotal notes and a video replay of the lesson gave the observer a powerful tool for helping the teacher understand any of his behaviours that were detrimental to the amount of ALT-PE within the lesson. Examples of teacher
behaviour being discussed were illustrated using the video replay. This enabled the teacher to understand any problems. Through a greater understanding, changes in behaviour resulted and subsequent improvements were made. Examples of anecdotal notes taken using the Class Analysis Sheet are shown in Appendix 6.

3. Post Conference

During the post conference, interpretations of the data were shared with the teacher. Expansion of the teacher’s repertoire of skills was necessary so that he had more options in future lessons. On a positive note, the conference identified the effective teacher behaviours, giving reasons for their effectiveness.

Based on discoveries made during the post conference, planned action for future lessons was necessary. The teacher was encouraged to identify a skill that could be improved. Help was given with developing strategies to reduce unsatisfactory outcomes.

Similar and different teaching strategies were needed in future lessons. Less effective aspects of teaching not evident to the teacher needed to be labelled and identified. This helped the teacher develop alternative procedures which gave the potential to increase effectiveness.

As there was a decrease in general content, there was an increase in PE content. Likewise, as there was a decrease in nonengaged time, there was an increase in engaged time. A comparison of ALT-PE scores between each lesson was used to measure improvements in teacher effectiveness.
Metzler (1979) referred to the drastic funnelling effect. This described how percentage values constantly decreased from PE content to engaged time to motor response. This inevitably arrives at the amount of ALT-PE in a lesson.

Evidence of this funnelling effect was looked for in the study. One goal of the feedback given was to increase each of these categories so that the teacher could become more effective.

Limitations and Delimitations

1. The study is based on the results of one teacher in a primary school.

2. All lessons in this study were based on one sport. Mini-tennis was chosen as it is a new activity at the school. There was no control over the students' prior knowledge of mini-tennis.

3. Academic learning time was used as a measure of teacher effectiveness. ALT-PE was an important aspect of teacher effectiveness, but cannot be used exclusively. Teacher effectiveness is a very broad area. This study focused on increasing the quality and quantity of time on task by reducing the management and instructional aspects of teaching.

4. Information about each lesson was gathered using a 5 second interval recording system. This, in effect, means that only half of the physical education lesson was observed as it takes 5 seconds to record and discriminate behaviours.
5. The ALT-PE/SPORT instrument uses five second interval recording. The behaviour that takes up the majority of the time for the interval is recorded. However, in the case of a student practising the criterion skill, where it may only take one second to hit the ball, activity is still recorded. The key behaviours exhibited in a lesson are presented as a percentage of lesson time.

6. Observations were based on a target student and generalised to the whole class. A reliability study was conducted, taking into account variations between students meeting the target student criteria. The results when recording ALT-PE results in a lesson for two target students indicated a high level of reliability with an expected generalizability coefficient of 0.94 for ALT-PE results. Thus, it was concluded that the reliability of the ALT-PE data was satisfactory.

7. The teacher took similar lessons with both classes. This ensured that lesson content was similar so that any increases in ALT-PE were more likely to have resulted due to a change in teacher behaviour, rather than due to a change in the nature of the task. This procedure was chosen in preference to intervening on the one class where the teacher takes a series of six or more lessons. This approach does not standardize the content. It was presumed that by lesson 5 and 6 the students would be involved with playing the game rather than being involved in skills practices instructed by the teacher. This would make intervention less effective.

8. The researcher was also responsible for all the recording of data. Steps were taken to reduce any prejudicing of the data.
9. Anecdotal records were kept for each lesson. This added strength to the systematic observation instrument when providing feedback to the teacher.

Ethical Considerations

1. The name of the teacher and the school remained confidential. The teacher had the right to withdraw at any time.

2. The teacher was informed about the nature of the research and the benefits were clearly pointed out.

3. The physical educational specialist participating in this research gained valuable information enabling him to improve his own teacher effectiveness.

4. In the event of any injury during the physical education lessons, the school was covered as the lessons were set up under the physical education specialist's normal teaching timetable.

Summary

This chapter has provided a detailed presentation of the methods and procedures employed in the study. A description of subjects and characteristics of the target pupils were provided, the single subject research design was discussed and the six lessons were outlined showing the baseline and intervention phase. An explanation of the two recording instruments was followed by appropriate and
inappropriate examples of the key behaviours used in the ALT-PE/SPORT instrument. The three areas in which reliability was established were followed by aspects pertaining to validity. All three aspects were considered where intervention on ALT-PE was observed to ensure that there was a valid test of change in an individual's performance. A summary of the procedures is shown in Table 4.

**TABLE 4**
**SUMMARY OF PROCEDURES**

1. Selected classes to be observed.
2. Selected target pupils for class A and B.
3. Established inter-observer reliability.
4. Teacher planned lessons.
5. Established a baseline for ALT-PE by observing Class A.
6. Gave intervention on ALT-PE once a baseline had been established.

The final section was devoted to data presentation. It was reported that raw data will be presented as a percentage of class time devoted to each key behaviour. Percentage data and anecdotal notes about each lesson were chosen to provide the teacher with feedback during the intervention phase.

Chapter Four includes tabular and graphical presentations and accompanying text to facilitate the analysis and discussion of data.
CHAPTER 4

RESULTS
CHAPTER 4

RESULTS

This chapter presents data pertaining to the scores recorded for the teacher during the baseline and intervention phases of the study. Results are presented in tables containing raw scores, percentages and differences between the mean scores in the baseline and intervention phases of the study. Graphs are used to allow visual inspection of the data and to highlight changes in the individual teacher behaviours between each phase of the study. The six lessons used in this study provide the data to investigate each of the research questions stated in Chapter 1. A discussion of the results will conclude this chapter.

The results obtained from the ALT-PE/SPORT instrument, together with anecdotal comments on the teacher's behaviour, will assist in answering the major research question of the extent and way that ALT-PE can be increased in the teaching of physical education.

Analysis of the Results

Research Question 1

How much ALT-PE are students receiving in a normal physical education lesson?

The results for the study are presented in Table 5.
### TABLE 5
A BREAKDOWN OF THE KEY BEHAVIOURS FROM LESSON 1 - 6.

<table>
<thead>
<tr>
<th>Key Behaviours</th>
<th>Baseline</th>
<th>Intervention</th>
<th>Baseline</th>
<th>Intervention</th>
<th>Baseline</th>
<th>Intervention</th>
<th>Baseline</th>
<th>Intervention</th>
<th>Baseline</th>
<th>Intervention</th>
<th>Baseline</th>
<th>Intervention</th>
<th>Baseline</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lesson 1</td>
<td>Lesson 2</td>
<td>Lesson 3</td>
<td>Average for</td>
<td>Lesson 4</td>
<td>Lesson 5</td>
<td>Lesson 6</td>
<td>Average for</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Management</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Transition</td>
<td>80</td>
<td>51.3</td>
<td>66</td>
<td>46.2</td>
<td>71</td>
<td>52.6</td>
<td>72.33</td>
<td>50.03</td>
<td>58</td>
<td>33.5</td>
<td>56</td>
<td>38.4</td>
<td>79</td>
<td>38.4</td>
</tr>
<tr>
<td>Waiting</td>
<td>8</td>
<td>5.1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1.5</td>
<td>3.33</td>
<td>2.2</td>
<td>2</td>
<td>1.2</td>
<td>7</td>
<td>4.8</td>
<td>8</td>
<td>3.9</td>
</tr>
<tr>
<td>Knowledge</td>
<td>29</td>
<td>18.6</td>
<td>30</td>
<td>21.0</td>
<td>16</td>
<td>11.9</td>
<td>25.0</td>
<td>17.16</td>
<td>22</td>
<td>12.7</td>
<td>14</td>
<td>9.6</td>
<td>17</td>
<td>8.3</td>
</tr>
<tr>
<td>Activity $N^v$</td>
<td>8</td>
<td>5.1</td>
<td>5</td>
<td>3.5</td>
<td>9</td>
<td>7.0</td>
<td>7.33</td>
<td>5.2</td>
<td>9</td>
<td>5.2</td>
<td>6</td>
<td>4.2</td>
<td>9</td>
<td>4.4</td>
</tr>
<tr>
<td>$N^v$</td>
<td>28</td>
<td>18.0</td>
<td>25</td>
<td>17.5</td>
<td>22</td>
<td>16.3</td>
<td>25.0</td>
<td>17.26</td>
<td>79</td>
<td>45.7</td>
<td>58</td>
<td>39.7</td>
<td>85</td>
<td>41.3</td>
</tr>
<tr>
<td>Activity $N^s$</td>
<td>1</td>
<td>0.64</td>
<td>1</td>
<td>0.5</td>
<td>1</td>
<td>0.7</td>
<td>1.0</td>
<td>0.61</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2.0</td>
<td>5</td>
<td>2.4</td>
</tr>
<tr>
<td>$N^s$</td>
<td>2</td>
<td>1.3</td>
<td>16</td>
<td>11.2</td>
<td>10</td>
<td>7.4</td>
<td>9.33</td>
<td>6.63</td>
<td>3</td>
<td>1.7</td>
<td>2</td>
<td>1.4</td>
<td>3</td>
<td>1.5</td>
</tr>
<tr>
<td>Activity $A^I$</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Off Task</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(N)</td>
<td>156</td>
<td>143</td>
<td>135</td>
<td>73</td>
<td>146</td>
<td>206</td>
<td>156</td>
<td>143</td>
<td>135</td>
<td>73</td>
<td>146</td>
<td>206</td>
<td>156</td>
<td>143</td>
</tr>
</tbody>
</table>
During the first three lessons a stable baseline for ALT-PE was established, the average amount of ALT-PE being 17.3%. This was calculated by averaging the Activity-performing category (AP) for the first three lessons. This reflects the portion of the lesson where a student was performing the activity with success. Students were cognitively engaged on average for 17.2% of the lesson. Cognitive engagement refers to the time a student is watching a demonstration of the skill, or is listening to the teaching points about the skill or game.

Research Question 2

*Can the teacher increase ALT-PE following intervention?*

Feedback given after the third lesson and all remaining lessons resulted in an average ALT-PE measure of 42.2%. This represented an increase of 24.9% in the amount of ALT-PE students received from the baseline.

When comparing the first three lessons (baseline phase) to the last three lessons (intervention phase), some behaviours changed a great deal. Figures 5, 6 and 7 present the data graphically.

From these representations of the data the following findings are evident:

- Figure 5 shows a comparison of behaviours based on averages for the baseline and intervention lessons. During the baseline phase, transition time accounted for the greatest amount of time in each physical education lesson. However, during the intervention phase Activity-Performance accounted for the greater majority of each lesson.
Figure 5. A comparison of behaviours based on averages from lessons 1 - 3 (baseline) and lessons 4 - 6 (intervention).

Figure 6. ALT-PE as a percentage of total lesson time from lesson 1 to lesson 6.
Figure 6 illustrates the significance of the rise in ALT-PE from the baseline to the intervention phase. The baseline and intervention phase remain constant over the series of three lessons within each phase.

Figure 7 illustrates transition time as a percentage of total lesson time over the six lessons. A large decrease in transition time is shown in the intervention phase.

![Percentage of Transition Time](image)

Figure 7. Transition time as a percentage of total lesson time from lesson 1 to 6.

Research Question 3

*Which teacher behaviours changed to allow ALT-PE to increase?*
The results indicate that the teacher was able to modify his behaviour when given clear goals and specific feedback related to the key behaviours. Using the ALT-PE/SPORT Observation Instrument ensured precise and focused feedback. Video tapes were used to show the teachers more effective and less effective teaching behaviours within lessons. This appeared to have a strong impact on the teacher and helped form new planned goals for improvement. All feedback given during the intervention phase took place within two days following the lesson so that the lesson was still fresh in the teacher's mind.

As a result of preliminary discussions and selected video play-backs, the teacher set goals to improve equipment distribution, to give clearer instructions and to use alternative practice formations. A book relating to mini-tennis was provided to the teacher. As a result of the first intervention there was marked improvement. The amount of ALT-PE more than doubled. To achieve such a high percentage of ALT-PE there was a considerable reduction in transition time and in the time spent in activity supporting.

As a result of discussions during the second intervention, the teacher reported an awareness of the higher rate of ALT-PE in his lessons. He was aware that in previous lessons a considerable amount of activity time had been taken up by students supporting their partners. The teacher reported that the reference book on mini-tennis was valuable as it gave him a wider range of ideas for skills practices, rather than using his own ideas.

For the final lesson, the teacher was to continue in his progress by increasing the amount of ALT-PE students received. He also focused on having students actively involved in demonstrations where they practised the motor activity with
the teacher. The data presented in Table 6 shows how the average percentage of time in the baseline phase differed once intervention was given.

The key behaviours undergoing the most change were transition time, knowledge, activity performing and activity supporting. The changes in the teacher's behaviour that caused increases and decreases in these four key behaviours follow.

<table>
<thead>
<tr>
<th>Key Behaviour</th>
<th>Average for Baseline</th>
<th>Average for Intervention</th>
<th>Percentage Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>1.5%</td>
<td>0 %</td>
<td>- 1.5%</td>
</tr>
<tr>
<td>Transition</td>
<td>50.0%</td>
<td>36.8%</td>
<td>- 13.2%</td>
</tr>
<tr>
<td>Waiting</td>
<td>2.2%</td>
<td>3.3%</td>
<td>+ 1.1%</td>
</tr>
<tr>
<td>Knowledge</td>
<td>17.2%</td>
<td>10.2%</td>
<td>- 7.0%</td>
</tr>
<tr>
<td>Activity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Warm up</td>
<td>5.2%</td>
<td>4.6%</td>
<td>- 0.6%</td>
</tr>
<tr>
<td>- Performing</td>
<td>17.3%</td>
<td>42.2%</td>
<td>+ 24.9%</td>
</tr>
<tr>
<td>- Too Difficult</td>
<td>0.6%</td>
<td>1.5%</td>
<td>+ 0.9%</td>
</tr>
<tr>
<td>- Supporting</td>
<td>6.6%</td>
<td>1.5%</td>
<td>- 5.1%</td>
</tr>
<tr>
<td>- Inappropriate</td>
<td>0 %</td>
<td>0 %</td>
<td>0 %</td>
</tr>
<tr>
<td>Off Task</td>
<td>0 %</td>
<td>0 %</td>
<td>0 %</td>
</tr>
</tbody>
</table>

Comparison of Behaviours

Transition Time:

In the first three lessons prior to intervention, transition time occupied the majority of the lesson (50%). Intervention focused heavily on reducing transition time. Transition time was reduced by an average of 13.2% during the intervention.
phase. Modifications and discussions about the teacher's behaviour between the baseline and the intervention phase are listed below.

- Students wasted time travelling to and from the equipment bin during the lessons. Partners often shared equipment. It was suggested that all students should get a bat and ball at the commencement of the lesson, and leave unused equipment nearby when it was not required.

- Various teaching formations were discussed to allow the teacher more options for skills practice and demonstrations.

- After showing video play-backs of the lesson, the teacher recognized that far too much time was spent talking and explaining an activity in a repetitious fashion. Far more clear and precise instructions were needed.

- The teacher reduced the amount of time spent talking by providing feedback to individuals rather than the whole class. He talked only to those students who needed feedback.

- The teacher became more conscious of the time wasted when students entered and departed from a skill demonstration. Vocabulary was used to hurry up the students when moving to and from practice formations.

Activity-Performing:

The term Activity-performing referred to the criterion task being performed with a high amount of success (ALT-PE). The amount of ALT-PE increased 24.9% from the baseline phase. Intervention was aimed at modifying the teacher's behaviour in order to:
increase the types of practice formations and skills practices by providing a source book on mini-tennis;

encourage the teacher to explain the activity before the students moved so that practice could begin immediately;

use partner and individual activities in preference to relays. This resulted in higher amounts of practice time;

give longer practice time between teacher interruptions;

Activity-Supporting:

The term Activity-Supporting referred to the student supporting a partner in the skills practice, such as, bouncing the ball to the forehand side. In the baseline phase, activity supporting accounted for 6.6% of the lesson time. This could be considered a substantial amount of time as the supporting student is not involved in learning the criterion task. Intervention reduced the amount of time a student spent supporting another student by 5.1%. The supporting role rarely existed in the intervention lessons. The way in which the teacher modified his behaviour is listed below.

Skill practices selected did not require a supporting student. This resulted in whole class involvement in activities at the same time. Instead of a student bouncing the ball, the student would bounce-hit the ball to a partner, who would hit the ball back after the first bounce. The ball would be caught and the procedure repeated.
Knowledge:

Table 6 shows that there was a 7% decrease in the knowledge component of lessons. No feedback inferred that this key behaviour should be reduced. Two possible reasons for this decrease are listed below.

- The decrease could be contributed to the teacher attempting to have the students involved in active demonstrations. When students were involved in active demonstrations such as stepping through the serve action, Activity-Performing was recorded resulting in an increase in ALT-PE.

- The teacher reduced talking time by using clear and concise language.

It may be argued that the knowledge component, where students are involved in watching demonstrations or listening to the teaching points, strategies or rules of the game are equally as important as performing the motor activity.

Activity-Performing (ALT-PE) and knowledge appear to be the key behaviours that most effectively use the class time. Figure 8 has combined these two key behaviours. As a result, an average of 52.4% of class lesson time was devoted to the criterion task for the intervention phase. This compares with an average of 34.4% of class time during the baseline phase.
Figure 8. Student involvement with the criterion task from lesson 1 to lesson 6.

General class management, transition time, waiting to get involved in activity and supporting during an activity are not effective uses of lesson time. While students are experiencing these key behaviours they are not involved with the criterion task for the lesson. During the intervention phase, students were not involved with the task for an average of 41.6% of each lesson compared with 59.9% during the baseline phase. This is shown graphically in Figure 9. Warm-up activities were excluded from both categories, as it could be considered that warm-up activities are essential to every lesson. However, they may not relate to the criterion task for the lesson.
Figure 9. Student non-involvement with the criterion task from lesson 1 to lesson 6.

Research Question 4

*Do lessons that contain higher ALT-PE differ in structure to lessons with low ALT-PE?*

It has been established that the teacher modified his behaviour to produce lessons with a greater amount of ALT-PE. The two key behaviours that changed significantly between the baseline and intervention phase were Activity-Performing (ALT-PE) and Transition time. Lesson 1 and lesson 4 were compared to see what changes in lesson structure occurred. These two lessons were compared as they were the first lesson in each phase.
The lessons were analysed to obtain the average length of key behaviour episodes. The observation instrument used 5 second observe, 5 second record. This allows six key behaviours each minute. An episode is the number of uninterrupted blocks of time that the key behaviour occurred in the lesson. An episode block is recorded when there is one or more of the same key behaviour.

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<th>T</th>
<th>A</th>
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</table>

Episodes for (T)

In the above example, there are 3 episodes for the key behaviour transition (T).

Transition Time:

Table 7 compares the number of transition episodes between lesson 1 and lesson 4. Although lesson 4 has a greater amount of transition episodes, transition accounted for only 35.5% of the total lesson, compared to 51.3% for lesson 1. The average length for each episode was calculated by dividing the number of episodes into the total number of transition intervals.
TABLE 7
A COMPARISON OF TRANSITION TIME BETWEEN LESSON 1 AND LESSON 4

<table>
<thead>
<tr>
<th>Lesson</th>
<th>% of Lesson</th>
<th>No. of Transition Episodes</th>
<th>Average Length of Episodes</th>
<th>Length in Time</th>
<th>No. of Total Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>51.3%</td>
<td>22</td>
<td>3.64 sec</td>
<td>36.24 sec</td>
<td>80</td>
</tr>
<tr>
<td>4</td>
<td>35.5%</td>
<td>26</td>
<td>2.23 sec</td>
<td>22.18 sec</td>
<td>58</td>
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</table>

The results show that during the baseline phase the average length for each transition episode was 3.64 seconds compared with 2.33 seconds during the intervention phase. To give these figures a greater meaning the episode length can be converted to time. The data shows that during the intervention phase the teacher reduced the average length of each episode to 22.18 seconds, compared to 36.24 seconds during the baseline phase.

The teacher was conscious of the fact that transition time was not the most effective use of time and should be kept to a minimum. This reduction in transition episode time could be accounted for by the teacher using clear, concise and nonrepetitive instruction.

Academic Learning Time (ALT):

Table 8 compares the number of Activity-Performing episodes between lesson 1 and lesson 4. The results show an increase in Activity-Performing episodes in lesson 4 following intervention. The average duration of each Activity-Performing episode also increased from 28 seconds to 38 seconds. This accounts for why there was a greater number of Activity-Performing intervals in lesson 4.
TABLE 8
A COMPARISON OF ALT-PE BETWEEN LESSON 1 AND LESSON 4

<table>
<thead>
<tr>
<th>Lesson</th>
<th>% of Lesson</th>
<th>No. of Transition Episodes</th>
<th>Average Length of Episodes</th>
<th>Length in Time</th>
<th>No. of Total Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>18.0%</td>
<td>10</td>
<td>2.80</td>
<td>28 sec</td>
<td>28/156</td>
</tr>
<tr>
<td>4</td>
<td>45.7%</td>
<td>21</td>
<td>3.80</td>
<td>38 sec</td>
<td>79/173</td>
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</table>

Another aspect of lesson structure, that is evident between the baseline and intervention, is the patterns of the key behaviours within a lesson. In lesson 1, Activity–Performing is scattered between a mass of transition and knowledge episodes. The longest amount of time a student could practise the skill without interruption was 60 seconds. There are large amounts of time between skills practices. The longest period between any activity was three minutes. The majority of this three minutes was taken up in transition time, where the teacher was organizing the class for the next practice.

In contrast, lesson 4 shows a clearer picture of the lesson format. There are twelve different skills practices within the lesson. In between each of these practices are short episodes of knowledge and transitions. The longest amount of time between any two activities is also three minutes. However, of these three minutes, one minute and ten seconds is devoted to knowledge, and the remainder to transition time. In comparison, only ten seconds of this three minutes is devoted to knowledge in lesson 1. Table 9 displays key differences between lesson 1 and lesson 4.
TABLE 9
PATTERNS WITHIN AND BETWEEN LESSONS 1 AND 4

<table>
<thead>
<tr>
<th>Aspects</th>
<th>Lesson 1</th>
<th>Lesson 4</th>
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<tr>
<td>Time taken before first Activity-Performing behaviour</td>
<td>4.40 sec</td>
<td>3.30 sec</td>
</tr>
<tr>
<td>Largest Activity Performing episode</td>
<td>1.00 sec</td>
<td>1.40 sec</td>
</tr>
<tr>
<td>Largest Transition episode</td>
<td>2.10 sec</td>
<td>1.10 sec</td>
</tr>
<tr>
<td>Average length of time taken between Skills Practices</td>
<td>1.40 sec</td>
<td>33.00 sec</td>
</tr>
</tbody>
</table>

These data show that the teacher used less time organizing and instructing students between the various skills practices following intervention. Only an average of thirty-three seconds was required to give any necessary knowledge and to vary the skills practice.

Research Question 5

*How significant are the ALT-PE increases received by the children?*

No statistical measure can be used to gauge the significance of the increase in ALT-PE between the baseline and intervention phase. One way to show the significance of the ALT-PE increase is to change the percentages to an amount of time. Table 10 shows the ALT-PE for each of the six lessons in minutes and seconds. It should be noted that physical education lessons at the school are for thirty minutes duration. For the purpose of this study, lessons were also thirty minutes. For this reason, Table 10 has converted the percentages to time for a thirty minute lesson.
TABLE 10
THE AMOUNT OF ALT IN LESSONS 1 - 6 EXPRESSED AS A UNIT OF TIME.

<table>
<thead>
<tr>
<th>Lesson</th>
<th>% of ALT</th>
<th>Time (30 min lesson)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>18.0%</td>
<td>5 min 24 sec</td>
</tr>
<tr>
<td>2</td>
<td>17.5%</td>
<td>5 min 15 sec</td>
</tr>
<tr>
<td>3</td>
<td>16.3%</td>
<td>4 min 53 sec</td>
</tr>
<tr>
<td>Baseline Average</td>
<td>17.3%</td>
<td>5 min 11 sec</td>
</tr>
<tr>
<td>4</td>
<td>45.7%</td>
<td>13 min 43 sec</td>
</tr>
<tr>
<td>5</td>
<td>39.7%</td>
<td>11 min 55 sec</td>
</tr>
<tr>
<td>6</td>
<td>41.3%</td>
<td>12 min 23 sec</td>
</tr>
<tr>
<td>Intervention Average</td>
<td>42.2%</td>
<td>12 min 40 sec</td>
</tr>
</tbody>
</table>

When comparing the amount of ALT-PE offered following intervention, one notices an average increase of seven minutes twenty-nine seconds. At the primary school where the study was undertaken, the students are involved in two half hour skills sessions a week. Table 11 illustrates the significance of the increase in ALT-PE over a week, one term and a whole school year.

TABLE 11
TIME INCREASES OF ALT-PE FOLLOWING INTERVENTION.

<table>
<thead>
<tr>
<th>Increase in ALT</th>
<th>1 Week (Two lessons)</th>
<th>1 Term (10 weeks)</th>
<th>1 Year (40 weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 min 29 sec</td>
<td>14 min 58 sec</td>
<td>149 min 40 sec</td>
<td>598 min 40 sec</td>
</tr>
</tbody>
</table>

It should be noted that these times are only showing the increase in ALT-PE (the extra time they could be practising the criterion skill) following the modification to a teacher's behaviour. The final total of 598 minutes 40 seconds is the amount
of extra lesson time that the students would receive practising the criterion task over a year, if the teacher sustained this level of performance. Without intervention, the teacher would require a further twenty lessons to obtain the same amount of ALT-PE.

Discussion of Results

The results have been presented in graphs, figures and tables and the five research questions have been addressed. It is important, however, to discuss the results and to see how the results from this study compare to similar studies.

In an attempt to keep the results segmented, the results will be discussed in the three main areas of:

The baseline;

The intervention;

The teacher's perception.

Baseline

The amount of ALT-PE that students received during the baseline phase of this study compared favourably with results of other studies. Godbout et al. (1983) reported 20% ALT-PE and 14% cognitive engagement in the physical education lessons observed.

The baseline for ALT-PE in this study also compares closely with a study carried out by Placek et al. (1982). These results found that all students in the class
received an ALT measure between 15% and 24% of class time. The results showed little variation regardless of sex or skill level.

Other ALT-PE recordings from studies carried out in physical education remain reasonably consistent. Graham et al. (1983) found that students spent 21% of class time practising the criterion task.

The teacher was surprised by the amount of time that students were actually practicing the skill during the baseline phase. He believed that the level of ALT-PE was inadequate and far less than it should be. He was concerned at the amount of time taken up in the management and organization of instruction (transition time).

Intervention

The results have shown how the teacher was able to increase the amount of ALT-PE by 24.9% following intervention. A baseline of 17% ALT-PE increased to 29% ALT-PE. A study carried out by Paese (1987) reports a 12% increase in the amount of ALT-PE following intervention.

The results of this study indicated that the feedback given had a positive effect on modifying the teacher's behaviour. Clinical supervision was used to set the teacher clear goals from which he was able to modify management and student activity time in the intended direction. The researcher cannot assume that intervention is the sole factor for the change in behaviour. Three factors that may have influenced the results need to be recognized. The first factor is the change of classes between the baseline and intervention phase. The two classes were of the same age and from the same school. The second factor acknowledges that
the teacher may improve upon his performance when repeating a similar lesson. This is known as the coaching effect. The third factor that may have influenced the results is the fact that the researcher was also the recorder of the data.

In a physical education lesson there needs to be a balance between maximum activity time, demonstrations, knowledge, and clear instructions about the skill or game. These factors take up a large percentage of each lesson and have been shown to vary considerably between the lessons. Through the intervention programme, the teacher was able to modify his behaviour in many ways to increase the ALT-PE between the first and last lesson.

Teacher's Perception

Following the intervention used in this study, the teacher understood the need to increase the time spent by students practising the skill correctly. During a postlesson conference following the last lesson, the teacher stated that as much time as possible needs to be allocated to practising the skill as long as interest, variety and quality instructions are maintained.

He stated his major aims for being an effective teacher were to have sufficient equipment and organizational procedures to allow students maximum participation and equipment. He also believed effective physical educators need to have a good knowledge of skill development processes, give quality demonstrations and provide correct teaching points.

The teacher under study believed that the feedback given was most valuable. He believed that presenting the percentage figure of the lesson time devoted to ALT-PE highlighted a need for improvement. The teacher thought the anecdotal notes
and video play-backs were useful in identifying any weaknesses and modifying teacher behaviours.

Having someone providing feedback on a teacher's behaviour was acknowledged as being very valuable. He wished it could happen more often but admitted cringing at times when students did not understand any poorly-worded instructions.

In an attempt to increase the amount of time that students spent in learning during physical education, the teacher agreed that an ALT-PE/SPORT instrument would be worthwhile implementing as an effective style of feedback. The teacher suggested the idea of self-analysis, where the teacher codes a video tape on his own teaching taken by a peer or child. This would overcome the possibility of uneasiness.

Summary

This chapter has dealt with the analysis and discussion of the data. The chapter attended to the five research questions by providing a discussion of the subject and the behaviours that were associated with the investigation of each question.
CHAPTER 5

SUMMARY AND CONCLUSIONS
CHAPTER 5

SUMMARY AND CONCLUSIONS

This chapter presents a summary of the results together with the conclusions based on the results of the intervention on a teacher's performance. It concludes with recommendations for using ALT-PE for further study as a variable for measuring teacher effectiveness.

The purpose of this pilot study was to establish whether a designed procedure could increase the amount of ALT-PE. The procedure involved the provision of feedback to a teacher about a student's learning time and the proportion of that time which was ALT-PE.

This study used an experienced physical education specialist teaching a series of actual lessons to students in intact classes as part of the school's usual physical education programme. The students were already familiar with the teacher as he had been at the school for three years. This study attempted to make a practical and realistic contribution to the teacher effectiveness literature relating to what is happening in physical education.

In order to obtain the appropriate data, two year 6 classes participated in three mini-tennis lessons each. These lessons were held once a week over a period of six weeks. The first three lessons were taken with one class to establish a baseline. The last three lessons that incorporated intervention were taken with the other class. The two classes were taught the same content.
As a result of the classes' participation, the amount of ALT-PE that students received in the classes was established. The amount of ALT-PE the class received was derived from one target student. Once the results were obtained it became clear that the amount of ALT-PE was significantly greater once intervention occurred.

Summary of Results

The researcher's subjective opinion about the quality of the physical education specialist prior to the study suggested that class time was used efficiently. However, the first three lessons used to form the baseline showed that the behaviour paralleled those of previous studies in the literature. Students were not as active in the lessons as first thought.

It seems to be universally accepted that recognizing the opportunities for student learning is a viable characteristic of effective teaching (Grant, 1983). Classroom research has shown that there is a need to keep students on task and engaged in appropriate activities.

Two variables, content covered and academically engaged minutes, have yielded the highest and most consistent correlations and gains in achievement of any of the classroom variables studies. (Rosenshine cited in Graham et al. 1981, p. 24.)

This study was successful in meeting Rosenshine's variables that indicated gains in student achievement. Academically engaged minutes increased by an average of 24.9% following intervention. To achieve this increase, it was necessary to give feedback on class management and lesson content organization.
No stated amount exists to determine how much lesson time should be devoted to ALT-PE. The teacher is the best judge about how much ALT-PE should be given in a lesson. The teacher in this study believed that he would like to achieve a maximum of 45–50% ALT-PE in most lessons. He believes it would be difficult to achieve a higher result. Organizing and instructing the students is an essential part of every lesson. If categories other than ALT-PE are overlooked, the quality of student engaged time may deteriorate.

The data revealed that the teacher could change his key behaviours in the intended direction following intervention. The increase in the amount of ALT-PE students' received rose significantly from the baseline. The amount of ALT-PE did not keep increasing following each intervention. Following the first intervention the amount of ALT-PE remained fairly stable. Although no norm exists for the amount of ALT-PE expected in physical education lessons the content of a lesson can have an effect on the ALT-PE achieved. Due to this, it was decided to use two classes where lessons would cover similar content. The teacher was instructed to teach the first three lessons of mini-tennis to both classes. Standardizing content was chosen in preference to using only one class where content would differ. It would have been hard to intervene on teacher behaviours in lesson 5 and 6 as it was likely that children would be involved in actual games by that time. When children were playing the game the teacher would have less control over students' ALT-PE in the lesson, unless he was participating in the same game.
Conclusions

This study aimed to provide students with a greater amount of ALT-PE in physical education lessons. It was considered important to increase ALT-PE as it has been shown to relate to student achievement. Of particular interest to the researcher was to investigate how students spent their time in physical education lessons.

The results of the study were able to support the research question. The teacher can increase the amount of ALT-PE students receive. This was a result of intervention aimed at modifying teacher behaviours.

This study has shown that students are not so active during a physical education lesson as one might assume. Even though the quality of student engagement is just as important as the quantity, it is reasonable to accept that the students would benefit from a higher level of engagement in the learning task (Grant, 1983).

Results from other studies have suggested that more effective teachers are those that provide students with more ALT-PE. This study was able to increase ALT-PE, however, students were not measured for increases in skill level.

The teacher can influence the amount of ALT-PE students receive by using alternative skill practices and modifying some teacher behaviours. These increases in ALT-PE occurred with the teacher taking lessons of the same content.

The strength of the intervention given to the teacher is demonstrated by the increase in ALT-PE. The teacher, through assistance with goal setting, produced lessons with greater amounts of ALT-PE. It appears from this study that one
intervention may be adequate when attempting to increase ALT-PE. This is evident by the rapid increase in ALT-PE from the baseline phase. The amount of extra ALT-PE that students will receive throughout a whole year is very significant, presuming that the teacher can sustain his performance.

The findings of this study have implications for improving the quality of physical education teaching for preservice and postservice teachers. If greater student involvement is a high priority for teachers, then aspects such as ALT-PE may need to be investigated in order to improve the teaching-learning process. The effective interventionist needs to recognize and manipulate the influences on time. Certain variables work separately or in concert to affect time outcomes in physical education (Metzler, 1989).

From this study, it appears that it is difficult to keep children actively engaged for more than 50% of the lesson. Due to the nature of physical education, managerial tasks that involve giving instructions for skills practices, and time taken in organizing students, all take up valuable lesson time. Some teacher behaviours have been shown to contribute to higher levels of student involvement. Organizing the lesson content effectively, and careful choices of skill practices and demonstrations has increased the amount of ALT-PE that one teacher provides students.

It is very difficult to identify the exact teacher behaviours which contribute to high levels of involvement. Some class behaviours adopted by the teacher were less effective than alternative behaviours. The effectiveness of a particular class behaviour depends on the circumstances prevailing. One behaviour can be more effective in some situations than in others. For example, partner activities may be more appropriate when practising the forehand shot, rather than a line of students waiting to hit the ball back to the teacher.
The way the teacher plans time within the lesson has an important bearing on the way students spend their time. A study carried out by Arrighi and Young (cited in Metzler, 1989) stated that 9% of preservice teachers and 5% of service teachers cited maximum student participation as an indicator of successful teaching. Teachers are more likely to make plans based on student enjoyment. There is a need to impress upon teachers the importance of planning the use of time in physical education (Metzler, 1989).

Recommendations

Intervention of ALT-PE in this study was effective in increasing a teacher's effectiveness. However, it is recommended that:

1. More research is done on increasing the time that children are engaged in the task. At present, results returning from studies suggest that far too much of the lesson time is being wasted in nonlearning time. Physical education teachers as a group need to become more aware of the importance of effective time management.

2. Preservice teacher education courses stress the importance of time utilization in physical education. More research needs to be conducted on the relationship of time to student achievement. The importance of ALT-PE in relation to teacher effectiveness needs to be clearly established amongst physical education teachers. Once the importance of ALT-PE is understood and teachers begin to place importance on it then the quality of lessons will improve in physical education.
3. The variable of maximum participation be promoted until it becomes a major aim of physical educators.

4. ALT-PE is used as the basis for an in-service package in schools and districts. This could be conducted by the principals, peer teachers or staff from the regional office in an attempt to increase the quality of physical education. The results from this study have shown how a single observer intervention can significantly increase ALT-PE.

5. Further studies may investigate differences in the amount of ALT-PE between teachers. Variables such as years of service, and educational levels could be considered.

6. The amount of ALT-PE that specialist Physical Education teachers provide be compared with that provided by generalist classroom teachers.
REFERENCES
REFERENCES


### ALT-PE Category Sheet

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</tbody>
</table>

### Context Level

- Transition (T)
- Management (M)
- Break (B)
- Warm Up (W)

### Learner Involvement Level

- Interv (I)
- Not Involved (NI)
- Mot. Inappropriate (MA)
- Mot. Appropriate (MI)

### Critical Content

- Technique (T)
- Strategy (S)
- Social Behavior (S)

### SM Knowledge

- Skill Practice (P)
- Pre/Post Routine (PR)
- Background (B)

### SM Motor

- Motor Appropriate (MI)
- Motor Inappropriate (MA)
- Supporting (S)
- Cognitive (C)
How to Read the Sample Coding Sheet

ALT-PE coding provides a symbolic "script" of a lesson. With a little experience, a completed coding sheet can be easily "read" to provide a narrative description of what went on during a lesson. The sample lesson would be read as follows. (The "reading" goes down column 1 for S's 1, 2, and 3 and then across to column 2. The upper half of the coding sheet is the first half of the lesson. The bottom half of the coding sheet is the second half of the lesson.)

The lesson began with a managerial sequence which lasted for 7 intervals. This was followed by a rather lengthy transition episode (9 intervals which represents almost 2 1/2 minutes in the 8 second observe 8 second record format used here). There is then a brief focus on technique which is followed by a lengthy practice episode. A brief transition followed by another brief focus on technique is then followed by a second practice episode. A short transition then leads to an episode focusing on background material which leads into a brief session on rules. The remainder of the lesson is spent in a game context with a transition (to change teams). The lesson ends with a managerial episode.

There is some waiting during the transition episodes. S-1 was off task several times. S-2 didn't have the skills to actually play the game appropriately. When the teacher was giving information (technique, background, or transition) the students generally attended. The students were basically on task during the management and transition episodes, but typically had to wait after completing the transition tasks.

The lesson is a fairly typical team sport lesson. Only 27% of the intervals were ALT-PE intervals. Students moved from a practice task to a game context with no scrimmage opportunity.

(Sledentop et al. 1982, pp. 2)
APPENDIX 2
APPENDIX 2

ALT-PE/SPORT INSTRUMENT

ALT-PE/SPORT OBSERVATION

Teacher __________________ School/Club _______ Grade/Age _______ Date _______

Activity/Sport ______________ Start ___ Stop ___ Class ______

Observer ____________________

Key Behaviours:

Management (M) - related to class business, unrelated to instructional activity

Transition (T) - managerial and organizational activities related to instruction

Waiting (W) - completed a task, period of no activity and no movement between activities

Knowledge (K) - listening to instructions, watching a demonstration, questioning, discussing

Activity (A) - engaged in motor activity

Off Task (O)

Critical Incidents:

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

Other Comments:

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________
APPENDIX 3
# APPENDIX 3

## REVISED ALT-PE/SPORT INSTRUMENT

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Grade</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity</td>
<td>Start</td>
<td>Stop</td>
</tr>
</tbody>
</table>

Observer

### Key Behaviours:

**Management (M)** - related to class business, unrelated to instructional activity, e.g., taking attendance, discussing a field trip.

**Transition (T)** - management and organisational activities related to instruction, e.g., such as team selection, changing equipment from one space to another, and changing activities within a lesson.

**Waiting (W)** - completed a task, period of no activity and no movement between activities, e.g., waiting in line for a turn, or on a playing team but not actively involved.

**Knowledge (K)** - listening to instructions, watching a demonstration, questioning, discussing, e.g., engaged in a cognitive task such as listening to a teacher describe a game, watching a demonstration, participating in a discussion, or watching a film.

**Activity**

- engaged in motor activity.

- warm up exercises.

- Performance - activity relating to the objectives of the lesson.

- activity is being performed with very little success.

- Supportive - Active in a supportive role.

- Inappropriate - Activity does not relate to the objectives of the lesson.

**Off Task (O)** - a child not engaged in an activity s/he should be engaged in, e.g., behaviour disruptions, misbehaviour or talking when the teacher is talking.
APPENDIX 4
**APPENDIX 4**

**CODED ALT-PE/SPORT INSTRUMENT**

ALT-PE/SPORT INSTRUMENT

<table>
<thead>
<tr>
<th>Teacher</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity</td>
<td>Mini Tennis</td>
</tr>
<tr>
<td>Grade</td>
<td>6</td>
</tr>
<tr>
<td>Start</td>
<td>9:30</td>
</tr>
<tr>
<td>Stop</td>
<td>10:00</td>
</tr>
<tr>
<td>Class</td>
<td></td>
</tr>
<tr>
<td>Observer</td>
<td>WALKER</td>
</tr>
<tr>
<td>Date</td>
<td>Sept 12th 1989</td>
</tr>
<tr>
<td>Lesson</td>
<td>4</td>
</tr>
</tbody>
</table>

**Key Behaviours:**

- **Management** (M) - related to class business, unrelated to instructional activity, e.g., taking attendance, discussing a field trip.
- **Transition** (T) - management and organisational activities related to instruction, e.g., such as team selection, changing equipment from one space to another, and changing activities within a lesson.
- **Waiting** (W) - completed a task, period of no activity and no movement between activities, e.g., waiting in line for a turn, or on a playing team but not actively involved.
- **Knowledge** (K) - listening to instructions, watching a demonstration, questioning, discussing, e.g., engaged in a cognitive task such as listening to a teacher describe a game, watching a demonstration, participating in a discussion, or watching a film.
- **Activity** - engaged in motor activity.
  - (A^1) - warm up exercises.
  - (A^2) - performance - activity relating to the objectives of the lesson.
  - (A^3) - preperformance - activity is being performed with very little success.
  - (A^4) - supporting - active in a supportive role.
  - (A^5) - independent - activity does not relate to the objectives of the lesson.
- **Off Task** (O) - a child not engaged in an activity s/he should be engaged in, e.g., behaviour disruptions, misbehaviour or talking when the teacher is talking.
APPENDIX 5
APPENDIX 5

CLASS ANALYSIS SHEET

CLASS ANALYSIS

<table>
<thead>
<tr>
<th>Lesson Time</th>
<th>Anecdotal Description of Teacher Behaviours</th>
</tr>
</thead>
</table>


## APPENDIX 6

### ANECDOTAL DESCRIPTION

#### CLASS ANALYSIS

<table>
<thead>
<tr>
<th>Lesson Time</th>
<th>Aecdotal Description of Teacher Behaviours</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.54</td>
<td>Equipment distribution, relatively quick</td>
</tr>
<tr>
<td></td>
<td>(maybe activity while waiting)</td>
</tr>
<tr>
<td></td>
<td>or</td>
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<tr>
<td></td>
<td>explain what to do before entering court</td>
</tr>
<tr>
<td></td>
<td>so that equipment could be gathered and</td>
</tr>
<tr>
<td></td>
<td>activity begins rather than allowing</td>
</tr>
<tr>
<td></td>
<td>talking once whole class is spread out.</td>
</tr>
<tr>
<td>8.57</td>
<td>Could all children have a bat and leave</td>
</tr>
<tr>
<td></td>
<td>it at their feet while supporting.</td>
</tr>
<tr>
<td></td>
<td>Good practice formation but is supporting</td>
</tr>
<tr>
<td></td>
<td>a partner the best use of activity time?</td>
</tr>
<tr>
<td>9.00</td>
<td>High Practise time given</td>
</tr>
<tr>
<td></td>
<td>Perhaps use sick people as back ups?</td>
</tr>
<tr>
<td></td>
<td>Good amount of activity time given.</td>
</tr>
<tr>
<td>9.01</td>
<td>Children gone and collected the equipment</td>
</tr>
<tr>
<td></td>
<td>that could have had at the start. (time</td>
</tr>
<tr>
<td></td>
<td>wasted).</td>
</tr>
<tr>
<td>9.03</td>
<td>Good skill progression - high in activity</td>
</tr>
<tr>
<td></td>
<td>time.</td>
</tr>
<tr>
<td>9.04</td>
<td>Putting equipment back that could be used</td>
</tr>
<tr>
<td></td>
<td>to save transition time during skills</td>
</tr>
<tr>
<td></td>
<td>practice.</td>
</tr>
<tr>
<td></td>
<td>walking up giving bat to a partner wastes</td>
</tr>
<tr>
<td></td>
<td>time.</td>
</tr>
<tr>
<td>9.08</td>
<td>Knowledge - good short explanation of</td>
</tr>
<tr>
<td></td>
<td>common error.</td>
</tr>
<tr>
<td>9.10</td>
<td>Putting equipment away - 2 min 10 sec (wasted time)</td>
</tr>
<tr>
<td>9.13</td>
<td>Cool Down activity.</td>
</tr>
<tr>
<td></td>
<td>Practice formation</td>
</tr>
<tr>
<td></td>
<td>front person kneels</td>
</tr>
<tr>
<td></td>
<td>down when teacher (T) talks</td>
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</table>
## APPENDIX 6 (Continued)

### CLASS ANALYSIS

<table>
<thead>
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<th>Lesson Time</th>
<th>Aecdotal Description of Teacher Behaviours</th>
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<tr>
<td>9.32</td>
<td>Warm Up.</td>
</tr>
<tr>
<td></td>
<td>* Explanation was short, activity began immediately.</td>
</tr>
<tr>
<td>9.34</td>
<td>Gaining Equipment.</td>
</tr>
<tr>
<td></td>
<td>* Children only needed to go to equipment bin once.</td>
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<tr>
<td></td>
<td>* Once children obtained equipment they had a task to do rather than waiting.</td>
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</table>

### Activities.

* Pat bouncing and racket control has obvious high act time.  
* Short whistle blows to mean 'stop and eyes here' works well. Good short explanation in 5-10 secs to change activity and give feedback.  
* Activities were successfully broken up with feedback.  
* Activity time increased.

### Demonstrations

* Demonstration circle works well.  
Children move to that position very quickly with minimum transition time.  
* Ensure that the following practice is explained before children move off, so that activity can begin immediately.

### Partner Activities.

* Excellent combination of skills taught.  
Both children in partnership were involved in the activity in a competitive situation rather than one child supporting.

### Serving Demonstration

* Change from "knowledge" to Motor Activity by getting children actively involved with a step through demonstration.

* Far less time was wasted when both children have a bat and don't waste time giving bat to partner. Excellent.

* Good idea of yours using the supporting child to hit the ball rather than throwing it - (ALT-PE increases)

* Activity related to lesson to conclude and put equipment away.