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THE EFFECT OF DAILY MONITORING AND FEEDBACK
TO TEACHERS AND STUDENTS ON
ACADEMIC LEARNING TIME-
PHYSICAL EDUCATION

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By

Gary M. Whaley, B.A., M.A.T.

* * * * *

The Ohio State University

1980

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TABLE OF CONTENTS

ACKNOWLEDGMENTS ........................................ ii
VITA .................................................... iii
LIST OF TABLES ....................................... vi
LIST OF FIGURES ..................................... vii

Chapter

I. INTRODUCTION ........................................ 1
   Statement of the Problem ............................. 4
   Significance of the Study ............................ 4
   Delimitations ....................................... 6
   Limitations ......................................... 6
   Basic Assumptions .................................. 7
   Operational Definition of Terms .................... 7
   Summary ............................................. 8

II. REVIEW OF RELATED LITERATURE ..................... 9
   Investigations on Student Attention ............... 9
   Findings of the BTES Project ....................... 15
   Feedback ........................................... 20
   Summary ............................................. 28

III. METHODS AND PROCEDURES ........................... 30
   Subjects and Settings ................................ 30
   Subject Selection .................................... 36
   Dependent Variables ................................. 37
   Observation Instrument .............................. 38
   Materials ........................................... 41
   Observational Procedure ............................ 41
   Observer Training .................................... 42
   Reliability .......................................... 43
   Reactivity .......................................... 47
   Stages of the Study .................................. 48
   Experimental Design and Analysis of Data .......... 57
IV. ANALYSIS AND DISCUSSION OF THE DATA 59
   Reliability 59
   Discussion of Reliability 66
   Summary of the Data 66
   Discussion of the ALT-PE Data 86
   Teacher Behavior 92
   Summary 97

V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS 98
   Review of the Study 98
   Conclusions 102
   Recommendations 103

APPENDIXES
   A. OBSERVER TRAINING MANUAL 106
   B. INFORMED CONSENT FORM 136
   C. RANGES AND MEANS FOR EACH ACTIVITY 138

BIBLIOGRAPHY 140
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mean Percent Scored-Interval Reliability for All Observers Following Training</td>
<td>60</td>
</tr>
<tr>
<td>2.</td>
<td>Percent of Scored-Interval Reliability for Observer 1</td>
<td>62</td>
</tr>
<tr>
<td>3.</td>
<td>Percent of Scored-Interval Reliability for Observer 2</td>
<td>63</td>
</tr>
<tr>
<td>4.</td>
<td>Percent of Scored-Interval Reliability for Observer 3</td>
<td>64</td>
</tr>
<tr>
<td>5.</td>
<td>Percent of Scored-Interval Reliability for Observer 4</td>
<td>65</td>
</tr>
<tr>
<td>6.</td>
<td>Ranges and Means for Activities</td>
<td>139</td>
</tr>
<tr>
<td>Figure</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>1.</td>
<td>Sample of the Observation Instrument</td>
<td>40</td>
</tr>
<tr>
<td>2.</td>
<td>An Example of Graphic Feedback on Content Physical Education</td>
<td>50</td>
</tr>
<tr>
<td>3.</td>
<td>An Example of Graphic Feedback on Engaged Categories</td>
<td>51</td>
</tr>
<tr>
<td>4.</td>
<td>An Example of Graphic Feedback on Motor Response Category</td>
<td>52</td>
</tr>
<tr>
<td>5.</td>
<td>An Example of Graphic Feedback on ALT-PE</td>
<td>53</td>
</tr>
<tr>
<td>6.</td>
<td>An Example of Graphic Feedback on ALT-PE(M)</td>
<td>54</td>
</tr>
<tr>
<td>7.</td>
<td>An Example of Graphic Feedback on Motor Responses for the Class</td>
<td>56</td>
</tr>
<tr>
<td>8.</td>
<td>Content Physical Education</td>
<td>68</td>
</tr>
<tr>
<td>9.</td>
<td>Percent of Intervals of Engaged Categories, Subjects 1, 4, 7, 10</td>
<td>71</td>
</tr>
<tr>
<td>10.</td>
<td>Percent of Intervals of Engaged Categories, Subjects 2, 5, 8, 11</td>
<td>72</td>
</tr>
<tr>
<td>11.</td>
<td>Percent of Intervals of Engaged Categories, Subjects 3, 6, 9, 12</td>
<td>73</td>
</tr>
<tr>
<td>12.</td>
<td>Percent of Intervals of Motor Responses, Subjects 1, 4, 7, 10</td>
<td>76</td>
</tr>
<tr>
<td>13.</td>
<td>Percent of Intervals of Motor Responses, Subjects 2, 5, 8, 11</td>
<td>77</td>
</tr>
<tr>
<td>14.</td>
<td>Percent of Intervals of Motor Responses, Subjects 3, 6, 9, 12</td>
<td>78</td>
</tr>
<tr>
<td>Figure</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>15.</td>
<td>Percent of Intervals of ALT-PE, Subjects 1, 4, 7, 10</td>
<td>80</td>
</tr>
<tr>
<td>16.</td>
<td>Percent of Intervals of ALT-PE, Subjects 2, 5, 8, 11</td>
<td>81</td>
</tr>
<tr>
<td>17.</td>
<td>Percent of Intervals of ALT-PE, Subjects 3, 6, 9, 12</td>
<td>82</td>
</tr>
<tr>
<td>18.</td>
<td>Percent of Intervals of ALT-PE(M), Subjects 1, 4, 7, 10</td>
<td>83</td>
</tr>
<tr>
<td>19.</td>
<td>Percent of Intervals of ALT-PE(M), Subjects 2, 5, 8, 11</td>
<td>84</td>
</tr>
<tr>
<td>20.</td>
<td>Percent of Intervals of ALT-PE(M), Subjects 3, 6, 9, 12</td>
<td>85</td>
</tr>
<tr>
<td>21.</td>
<td>Percent of Intervals of ALT-PE(M) for 3 Subjects in School 1</td>
<td>89</td>
</tr>
<tr>
<td>22.</td>
<td>Percent of Intervals of ALT-PE(M) for 3 Subjects in School 2</td>
<td>90</td>
</tr>
<tr>
<td>23.</td>
<td>Percent of Intervals of ALT-PE(M) for 3 Subjects in School 3</td>
<td>91</td>
</tr>
<tr>
<td>24.</td>
<td>Percent of Intervals of ALT-PE(M) for 3 Subjects in School 4</td>
<td>92</td>
</tr>
<tr>
<td>25.</td>
<td>Percent of Intervals of Teacher Observation</td>
<td>94</td>
</tr>
<tr>
<td>26.</td>
<td>Percent of Intervals of Active Instruction</td>
<td>95</td>
</tr>
<tr>
<td>27.</td>
<td>Percent of Intervals of Managing Students and Environment</td>
<td>96</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

Teachers, teacher educators, principals, and superintendents have all expressed dissatisfaction with traditional practices in judging teacher effectiveness (McNeil & Popham, 1973). Focus on the teaching process rather than student achievement, the use of subjective ratings, and a lack of evidence of relationships between the teacher's process and student achievement have all contributed to past weaknesses in measuring teacher effectiveness.

More recently researchers are consistently reporting that the process variables of allocated time, engaged time, and student success rate all have significant positive association to student achievement (Berliner, 1979; Brophy, 1979; Fisher, Berliner, Filby, Marliave, Cahen, Dishaw, & Moore, 1978; Fisher, Marliave, & Filby, 1979; Powell, 1979; Rosenshine, 1979). Allocated time is defined as the amount of time the teacher has allotted for instruction in a particular curriculum content. The engaged time is the portion of the allotted time in which the student is on task. The success rate refers to the match between the required task and the student's ability to perform it. The research team at the Far West Laboratory for Education
Research and Development in the Beginning Teacher Evaluation Study (BTES) in California combined the three variables and labeled the new variable as Academic Learning Time (ALT). A series of studies has supported the concept of Academic Learning Time as being significantly, positively related to student achievement (Berliner, 1976; Filby & Cahen, 1977; Filbey & Cahen, 1978; Marliave, Fisher, & Dishaw, 1977; Marliave, Fisher, & Dishaw, 1978). Fisher et al. (1978) states that "students who accumulate more Academic Learning Time generally have high scores on achievement tests. This means that Academic Learning Time can be interpreted as an immediate, ongoing measure of student learning." Academic Learning Time then gives us an ongoing measure of teacher effectiveness that is related to student achievement.

Siedentop, Birdwell, and Metzler (1979) introduced the concept of Academic Learning Time to physical education. Standardized tests in physical education skills are much more difficult to develop than tests in math and reading due to the fact that physical education skills are interactional. This limits correlational studies that might be conducted in physical education for the purpose of validating the relationship between process measures and student achievement. Until valid and reliable standardized student achievement measures in physical
education are developed, ALT appears the best strategy for judging teacher effectiveness. Due to the problems of obtaining valid and reliable measures of student achievement in physical education, the rationale for using ALT to measure teacher effectiveness in physical education is derived from the BTES studies.

Metzler (1979) conducted the initial study with the Academic Learning Time-Physical Education (ALT-PE) instrument, a descriptive study of ALT-PE in the Columbus, Ohio, area. The Metzler study identified several problems that need to be addressed by physical educators. ALT-PE was found to be an average of 26% of the total intervals observed across all settings—elementary, junior high, and senior high schools. This compares to totals of 50% or more ALT found in math and reading by the Far West Lab Research teams in elementary school (Berliner, 1979). Metzler refined ALT-PE to ALT-PE(M). This is the percent of intervals that students are motorically engaged at an easy difficulty level. A bleaker picture is formed when one realizes that less than 10% of the total intervals observed were ALT-PE(M).

ALT-PE should certainly not be used simply as a judgmental device in determining teacher effectiveness, but could also provide a springboard for aiding and measuring teacher improvement. Indications from Metzler's data are
that possible techniques for increasing ALT in physical education settings need to be evaluated.

**Statement of Problem**

The primary question investigated was: "Can students' Academic Learning Time-Physical Education be increased by daily monitoring and providing graphic feedback to the in-service teacher and/or students?"

Sub-questions generated from the statement of the problem were:

1. Will graphic feedback to the teachers on ALT-PE categories increase the time in physical education content, the engaged time of students and ALT-PE for the target students?

2. Will graphic feedback to the students on motor responses serve to increase the time spent making motor responses, thus increasing ALT-PE(M) of the target students?

**Significance of the Study**

Information from actual observations and from Metzler's data indicate that there may be two lines of attack in attempting to increase ALT-PE. First is a design function. Teachers need to improve the planning of instruction and the organization and management of classroom events in order to maximize opportunities to respond. Second is a motivation function. An environment needs to be created such that students will take full advantage of the opportunities to respond that they have been afforded.
Metzler (1979) describes the classes observed in his study as being in physical education content for only 73.6% of the total class time, while only 36.1% of the time were the target students actually engaged. Waiting accounted for 20% of the total class time. These figures certainly substantiate the idea that teachers need to provide students more opportunity to respond.

Lengthy interim periods would frequently occur during Metzler's observations. These were characterized by students walking to pick up a stray ball and have a short chat with a friend before resuming practice. This interim period along with off task behavior accounts for 17% of the total intervals. Students needed to take better advantage of the opportunity they were provided.

A recommendation has been made that intervention methods, designed to increase ALT-PE, must have a low response cost for students and teachers to ensure their use in the classroom (Metzler, 1979). Graphic feedback was chosen as the independent variable in this study for two reasons. First, it was of little response cost to the students and teachers. Second, feedback has been demonstrated as effective in a variety of situations for creating behavior change (Annett, 1969; Crossman, 1979; Drabman, 1975; Whaley & Malott, 1971).

The feedback may function to occasion teachers to provide students with greater opportunity to respond and
to occasion students to take better advantage of the opportunity provided. However, the degree to which an increase in ALT-PE may be expected will vary from setting to setting according to the baseline rates of the students.

This study was conceived with the intent of providing evidence on directions physical educators should move in attempting to increase ALT-PE.

**Delimitations**

1. This study was delimited to indoor physical education activity classes.

2. This study was delimited to the physical education class behaviors of three middle school students and nine high school students in the Columbus, Ohio, area.

**Limitations**

1. The results of the study were limited to the four teachers consenting to work with the investigator.

2. The results of the study were limited to the activity in progress at the time of the intervention. The possibility exists that the ALT-PE of the target students may change due to a change in activity.

3. The results of the study were also limited to the number of observation periods available. The possibility exists that these students or teachers might miss several classes or move from the school district
Basic Assumptions

1. The students randomly selected for observation are representative of the students participating in the class.

2. The reliability checks conducted throughout the investigation are representative of the reliability of each observation.

Operational Definition of Terms

The following terms are to be used throughout the text of this study. These definitions have been provided to ensure these terms are interpreted accurately as used in this report. The definitions of the terms used in the observational instrument can be found in Appendix B.

Academic Learning Time-Physical Education - Time in which students were engaged in physical education content at an easy difficulty level.

Academic Learning Time-Physical Education (Motor) - Time in which students were motorically engaged in physical education content at an easy difficulty level.

Baseline - The level at which behavior is occurring before attempts are made to modify it (Crossman, 1979).

Behavior - Observable and measurable responses of an organism.

Dependent Variable - A variable that is measured while another variable is changed in a systematic way (Sulzer-Azaroff & Mayer, 1977). In this study, ALT-PE, ALT-PE(M), Motor Response, and Engaged Time are all serving as dependent variables.
Feedback - Information that an individual or class receives about their response as a consequence of that response.

Independent Variable - The manipulated variable in the experimental design. In this case, feedback serves as the independent variable.

In-service Teacher - A teacher who is employed full-time by a school district and possesses the professional certification for a subject matter area.

Interval Recording - A type of observation recording which measures the occurrence or non-occurrence of behavior within specified time intervals.

Intervention - The introduction of an independent variable in an attempt to modify behavior.

Reactivity - Interference or the intrusiveness of the observer himself upon the behavior being observed (Weick, 1968).

Reliability - The degree to which two independent observers agree upon the occurrence of a specified behavior at a specified time.

Summary

In this chapter, a brief rationale for the use of Academic Learning Time in measuring teacher effectiveness was presented as were findings of the initial research of Academic Learning Time in physical education. The problem statement for the study was identified and the significance of pursuing this line of inquiry was discussed. The chapter concluded by stating the delimitations, limitations and giving the operational definitions of terms.
CHAPTER II

REVIEW OF RELATED LITERATURE

Areas in the related literature relevant to the use of feedback as a means for increasing ALT will be divided into three categories: investigations on student attention, the findings of the BTES project, and feedback to teachers and students for the purpose of improving students' achievement.

Investigations on Student Attention

According to Jackson (1968), Morrison (1927) was a pioneer in investigating student attention as an indication of teacher effectiveness. Morrison situated the observer in a position to see all students' faces. Each minute the observer counted the number of students obviously inattentive. Morrison's major purpose was to improve teaching so he did not provide descriptions of his findings.

William French (1924), as one of Morrison's students, conducted an investigation in which he correlated ratings of teachers' abilities with student attention during recitation periods. The teachers who administrators rated as the most effective were almost consistently the
teachers who were able to hold students' attention. This provides credence to Morrison's commitment concerning the significance of teacher control techniques in education. Several other researchers of that day also reported investigations in support of Morrison (Bjarnason, 1925; Blume, 1929; Symonds, 1929).

A decline of interest in investigating student attention occurred after the thirties and lasted until the mid-sixties. Jackson cites several reasons for its decline. First, investigators expressed serious misgivings as to the reliability and validity of student attention measures (Barr, 1929; Shannon, 1936; Shannon, 1942; Washburne et al., 1926). At the time, there was a move toward democratic teaching practices and an interest in progressive education. The idea of keeping students' attention had an authoritarian connotation. Finally, the Freudian psychology movement was rising, and interest shifted from students' overt behaviors to internal, unconscious reasons for those behaviors.

By 1966, researchers again began to investigate student attention as advocated by Morrison. Hudgins (1966) used a pair of observers to collect group attention scores. Periodically during the class, students would be interrupted to self-report their degree of attention just prior to the interruption. Hudgins concluded that observers could detect a high
degree of inattention, but were unable to detect subtle inattention, such as students looking at the teacher and thinking about matters unrelated to class.

Lahaderne (1967) employed the same student attention measurement techniques as Hudgins. She correlated student attention measures with attitude questionnaires toward school and standardized achievement tests. Lahaderne's findings indicated no relation between student attention and attitudes toward school, but a positive relation between student attention and scholastic achievement.

Three conclusions are presented by Jackson (1968) concerning the research efforts on student attention. The amount of student attention is high; overestimations of student attention is commonplace; and the degree of student attentiveness is positively related to student achievement and estimates of teacher effectiveness.

More recently, the variable of student attention has been altered from Morrison's use of the term and now is called engaged time. Engaged time represents time when students are responding as well as paying attention during recitation periods. In a review dealing with student engagement, Bloom (1974) found a positive relation between engaged time and academic achievement. Stallings and Kaskowitz (1974) investigated student engagement in reading and math. Students were coded as
attending when obviously engaged in those activities. They reported higher correlations between engaged time and achievement gains than any other coded behavior.

Rosenshine (1979) reports that almost universally, studies reveal that significant positive relations were found between content covered and gains in student achievement. With this in mind and with the knowledge of the results of studies on student engagement, Rosenshine and Berliner (1978) combined the two variables and called it student engaged academic time (SEAT). The operational definition of SEAT was, "the time which a student spends engaged in academically relevant material of a moderate level of difficulty." It was assumed that more SEAT would produce more achievement, so SEAT was used as a dependent variable and attempts were made to increase SEAT in classrooms.

However, later investigations suggested that it is not a moderate level of difficulty that correlates with achievement, but rather a low level of task difficulty or a high success rate (Fisher et al., 1978). Thus, the final definition of Academic Learning Time (ALT) was developed as the amount of time a student spends engaged in relevant tasks with a high success rate. This leads to the findings of the BTES literature which will be discussed later.
At the same time the research on ALT was being conducted, a separate and equally exciting project was being undertaken at the University of Kansas under the direction of R. Vance Hall. A series of investigations led this research team to the conclusion that more active responding on the part of students will increase student achievement. Daily written responses by high school students was effective in increasing unit test grades (Harris & Hall, 1972). Increasing the time of practicing multiplication facts increased achievement gains of elementary students (Delquadri, Greenwood, & Hall, 1979). They cite several other studies supporting the notion that academic engaged time is positively related to student achievement.

Descriptive data from the research at the University of Kansas closely resemble the data of the BTES work and Metzler's (1979) report, indicating that student responding is actually very low (Greenwood, Delquadri, Preston, & Hall, 1979). Just as Rosenshine and Berliner used SEAT as a dependent variable, Hall and his colleagues used opportunity to respond. Delquadri (1979) used a peer tutoring game to increase spelling practice. Thurston and Heggie (1979) trained parents to tutor their children at home in order to increase the children's opportunity to respond. Greenwood (1979)
increased the response opportunities of a 13-year-old EMR student with the volunteer help of a grandmother.

Only a handful of recent studies in physical education have examined student time involvement. These studies have come from the research programs at Teachers College at Columbia University under the direction of William G. Anderson and The Ohio State University under Daryl Siedentop.

The research efforts at Teachers College centered around the development of a Videotape Data Bank (Anderson, 1975). The data bank includes more than 80 videotapes of elementary, junior high, and senior high school physical education classes and was developed for the purpose of descriptive-analytic research. Laubach (1975) developed a system to observe the behavior of students in physical education (BESTPED). Costello (1977) used BESTPED to analyze student behavior and reported that students were in movement 36.8% of class time, whereas nearly half of the class time was spent in non-physical education related activities, such as relocating. Students were coded as wait for 35.4% of the class time and spent 25.4% of time receiving information.

At Ohio State, two descriptive-analytic studies provided some understanding of student time involvement. The focus of the studies dealt with teacher time; however,
the categories used give an indication of student participation. Stewart (1978) reported that, for the classes observed, 25.9% of time was management, 10.3% was instruction, students were in activity 61.7% of the time, and waited 2.1% of the class time. Quarterman (1977) used three categories and reported that instruction took 12.2% of class time, management was 32.2% of time, and students participated 54.3% of the class.

One should not generalize from the two Ohio State studies to Costello's findings. Costello focused directly on the students, whereas the two Ohio State studies focused on teacher behavior and the class unit. The participation category in the Ohio State studies did not distinguish between movement and non-movement activity, such as waiting.

It is evident that physical educators need to take a long, hard look at what students are actually doing in physical education classes. Other areas of education have shown positive results by focusing on student time, and this should be a productive avenue for physical educators to follow.

Findings of the BTES Project

The Beginning Teacher Evaluation Study (BTES) was initiated in 1972 at the Far West Laboratory for Education Research and Development. From the investigations
undertaken here, the concept of Academic Learning Time was developed as discussed earlier in this review. As Fisher et al. (1978) reported, the research program was conducted in three distinct phases. Phase One, conducted in 1972-1973, was a planning phase. Phase Two was undertaken for the purpose of developing an observational instrument and to generate hypotheses. Phase Three (1974-1978) consisted of field studies.

During Phase Two, the conceptual basis of the Experimental Teaching Unit (ETU) was developed. Filby (1976, 1977) reported this as a research tool to be used in studying teacher effectiveness. An ETU was a standardized instructional package used to compare effectiveness of teachers. It consisted of instructional objectives in a novel subject matter that were implemented of a period of a few weeks. The process for achieving the objectives was left entirely to each teacher. Achievement, thus teacher effectiveness, was then measured in pre-post tests (Ward & Tikanoff, 1976).

The essence of this section of the literature review is to present the conclusions of the BTES project based on the field studies. Fisher et al. (1978) has summarized the 14 major conclusions in two groups: (a) academic learning time and student achievement and (b) instructional processes and classroom environment.
Academic Learning Time and Student Achievement

1. The amount of time that teachers allocate to instruction in a particular curriculum content area is positively associated with learning in that content area.

2. The proportion of allocated time that students are engaged is positively associated with learning.

3. The proportion of time that reading or mathematics tasks provide a high success rate for a student is positively associated with student learning.

4. The proportion of time that reading or mathematics tasks provide a low success rate for a student is negatively associated with student learning.

5. Increases in Academic Learning Time are not associated with decreases in attitude toward mathematics, attitude toward reading, or attitude toward school.

The implication is that ALT can provide an ongoing measure of student achievement and thus of teacher effectiveness. ALT can be treated as a dependent variable and intervened upon in an attempt to improve it, thus improving the effectiveness of the teacher.

Instructional Processes and Classroom Environment

6. The teacher's ability to diagnose student skill levels is related to student achievement and Academic Learning Time.

7. The teacher's ability to prescribe appropriate tasks is related to student achievement and student success rate.

8. More substantive interaction between the student and an instructor is associated with higher levels of student engagement.

9. Academic feedback is positively associated with student learning.

10. Structuring of the lesson and giving directions on task procedures were positively associated with student success rate.
11. Explanation specifically in response to student need is negatively associated with student success rate.

12. More frequent reprimands for inappropriate behavior are negatively associated with student learning.

13. The teacher's value system is related to Academic Learning Time and to student achievement. Teacher emphasis on academic goals is positively associated with student learning.

14. A learning environment characterized by student responsibility for academic work and by co-operation on academic tasks is associated with high achievement.

The implication of these final nine conclusions is that several avenues may be attempted in order to increase ALT. Conclusions 6 through 12 indicate that an increase in certain teacher behaviors, such as feedback, may also increase ALT. Conclusions 13 and 14 indicate that teachers and students both must care about achieving. It may be that teachers and students do care, but many times are not cognizant of the way time is used in class. Thus, feedback may be useful as an unobtrusive means for increasing ALT.

Several interventions have been used to increase ALT at the direction of Berliner (1978) and three other members of a research team. Following the gathering of a descriptive base, attempts were made to increase ALT. No set pattern of intervening was utilized. Consultants were made available for one teacher. Television was used as a feedback device in three
classrooms. Curriculum materials were used for another teacher and a clock was installed in a classroom for another. The decision on what to use was based on whatever seemed appropriate. The interventions showed positive results. One implication is that there is a variety of variables controlling ALT, and a variety of interventions may be useful in increasing ALT.

Metzler (1979) helped design an interval recording system to measure ALT in physical education (ALT-PE). He then used the system to measure ALT-PE in 33 classes throughout the Columbus, Ohio, area. The classes were evenly divided across elementary, junior high, and high school grades. Metzler reported the following findings:

1. Content-Physical Education accounted for 73.6% of the class time.
2. Students were engaged 49.2% of the observed intervals.
3. Students were making a motor response 19.1% of the intervals.
4. ALT-PE occurred 26.8% of all intervals.
5. ALT-PE(M) occurred 7.5% of all intervals.

These data suggest the need to intervene on ALT-PE in an attempt to improve teacher effectiveness of physical educators. An unobtrusive method, requiring little effort on the part of teachers and/or students is desirable to ensure its utilization. As mentioned above, the use of feedback may be one method for accomplishing this task.
Feedback

The purpose of this section of the review is to illustrate the efficacy of the use of feedback in a variety of educational settings and across many behaviors. Feedback has been used as an independent variable in many different settings in an attempt to change a variety of behaviors. Demonstration of the effectiveness of feedback has been illustrated in special education settings (Levy, 1974; Worland, 1976), classroom settings (Broden, Hall, & Mitts, 1971; Cooper, Thompson, & Baer, 1970; Drabman & Lahey, 1975; Kepler, 1977; Overall & Marsh, 1975; Van Houton, Hill, & Parsons, 1975), student teaching experience (Boehm, 1974; Cramer, 1977; Darst, 1974; Dessecker, 1975; Dodds, 1975; Hamilton, 1974; Hughly, 1973; Hutzler, 1976; McKenzie, 1976; Rife, 1973), and in physical education and sport settings (Crossman, 1979; DeBacy, 1970; Komaki & Barnett, 1977; Lloyd, 1969; McKenzie, 1972; McKenzie & Rushall, 1974; Thompson, 1969; Watkins, 1963; Zebas, 1975).

Special Education and Classroom Settings

Levy (1974) investigated the effect of feedback on tracking a light beam with educationally-mentally retarded individuals. The experimental group received feedback on their performance, while the control group received no feedback. Results indicate that the group
receiving feedback showed significantly more improvement than those not receiving feedback. Hyperactive boys were the subjects in a study by Worland (1976). Three conditions were used, and the effect of each on correct spelling was observed. The conditions were no feedback, positive feedback, and negative feedback. The hyperactive children were on task more often during the negative feedback phase, but spelling errors also increased.

Van Houten, Hill, and Parsons (1975) report two experiments in the classroom regarding the use of feedback. Story writing performance was the target behavior for the first study. After baseline composition rates were determined, the investigators intervened with feedback about those rates. Subsequent improvement on composition rates was observed. Public posting of the composition rates improved the performance still more. Reading and language skills of fifth grade students were targeted in the second study. The intervention consisted of feedback, public posting, and praise and affected improved performance on both skills.

In another investigation, the inappropriate classroom behavior of a ten-year-old girl was targeted for reduction (Drabman & Lehay, 1975). Observers event recorded positive and negative comments made to the
subject by her classmates and teacher during classroom time. At the point of intervention, the teacher provided ratings four times every class session on the appropriateness of the subject's behavior. This brought an increase in positive comments toward the subject and also a decrease in the inappropriate behaviors of classmates. This demonstrates how effective and cost efficient feedback can be.

Feedback from students to teachers has proved successful in changing teachers' behavior. Kepler (1977) studied the use of students providing descriptive feedback about their teacher's behavior in a middle school. The feedback was effective in bringing about behavior change of the teachers. The teachers reacted favorably to the technique and extended it to classes other than those of the original study. Overall and Marsh (1975) used student feedback to change instructional effectiveness of college professors. A control group of teachers received no feedback during the term and an experimental group received information from the students. At the end of the term the experimental group received higher student evaluations about their teaching than did the control group. Extraneous variables may have had an influence on these results, however, so one must be careful in interpreting the results.
Student Teacher Behaviors

Feedback was used as a part of a "package intervention" in affecting change in student teachers in a series of studies at The Ohio State University. These studies were done from 1973-1977 under the direction of Daryl Siedentop.

Rife (1973) used modeling combined with feedback to change types of feedback emitted by student teachers. While the investigator taught the class, he exaggerated the target behaviors in order to model those behaviors. After the student teachers attempted to emulate the investigator, feedback was provided in the form of cues, graphic feedback, and reinforcement. The results showed that the combined techniques reduced negative feedback and increased positive feedback of the student teachers. Hughley (1973) used a similar package to affect change in eight teacher behavior categories. He concluded that "directed information feedback is effective in producing teacher behavior changes in physical education student teachers."

The competency program involved instructions, cuing, reinforcement, graphic feedback, and goal setting. Specific behavioral objectives were outlined in each module. Significant positive changes in student teaching behavior occurred in all settings.

Dodds (1975) and McKenzie (1976) used peer assessments to develop the teaching skills of student teachers. Dodds had student teachers code their peers once each day and provide graphic and verbal feedback to each other. The supervisor designed modules and set goals for each student teacher. Student teachers were able to acquire the teaching skills at the criterion levels, but failed to maintain those levels after intervention had ceased. McKenzie had student teachers participate in a behavioral workshop designed to teach them how to alter pupil behavior. A package intervention with peer assessment was utilized to alter student teaching behavior. Positive changes were affected in both pupil and student teacher behavior.

Dessecker (1975) implemented a self-assessment model through the use of audio tape recorders. The student teacher coded the behavior being intervened upon and forwarded the tape to the university supervisor for a reliability check. Results indicated that significant positive changes were made in student teaching behavior.
Hutsler (1976) and Cramer (1977) investigated the possibility of using the co-operating teacher to systematically affect change in student teacher behavior. Hutsler (1976) trained elementary school co-operating teachers to observe and record student teacher behavior in one class each day. The co-operating teacher graphed the data and set out to change the student teachers' behavior they deemed most critically in need of improvement. A multiple baseline analysis demonstrated a significant effect for co-operating teachers on producing changes in the student teachers' behavior. A control group in the regular student teaching experience did not evidence any substantial changes. Cramer (1977) replicated Hutsler's (1976) study on the secondary school level. Similar results were reported.

Feedback to the student teachers on their behaviors was an integral part of all of the aforementioned studies. Feedback was combined with other techniques and in every case helped produce changes in student teacher behavior.

Physical Education and Sport

The use of feedback for the systematic improvement in the performance of physical skills is fairly recent in the physical education research literature. Feedback has been presented in a variety of ways including

Watkins (1963) used feedback via videotape to correct faults in a baseball batting swing. DeBacy (1970) and Thompson (1969) used videotape to improve golf swings. Lloyd (1969) attempted to determine if the use of film would enhance the learning of ground strokes in tennis. The results showed that it was not effective. However, the feedback from the film was delayed for one week which may have resulted in a loss of its reinforcing properties. Zebas (1975) used three conditions to determine their effects on the standing broad jump of high school girls. The conditions were videotape feedback, monetary rewards, and no reward or feedback. Results showed no difference among the three conditions.

McKenzie (1972) used a notice board in an attempt to reduce inappropriate behaviors of a competitive swim club. The target behaviors were late arrivals, early departures, and absenteeism. All three were reduced significantly, and early departures were eliminated. With the same subjects, McKenzie and Rushall (1974) used program boards to increase the work rate
of the swimmers during practice. The athletes self-recorded their workouts and this intervention increased work output during practice by an average of 27.1%.

Komaki and Barnett (1977) worked with nine- and ten-year-old members of a Pop Warner football team. The investigators targeted three frequently-run offensive plays for improvement. They analyzed each into a task of five behaviorally defined stages. A checklist was then conducted for observing play execution. The intervention consisted of presentation and explanation of the checklists and verbal feedback, either praise or corrective feedback, following each play. The intervention was analyzed by a multiple baseline design which demonstrated the positive effects of the feedback.

Crossman (1979) used graphic feedback in an attempt to increase the productive use of time for athletes. The investigator used a multiple baseline design across three settings. Collegiate wrestlers, female volleyball players, and a gymnastics club served as subjects. Crossman provided graphic feedback to individual athletes as to their productive time in practice. Productive use of time increased in two settings and decreased in one.

In conclusion, although not universally successful, feedback has been demonstrated as being a cost efficient and effective technique for changing behavior. In
an initial attempt to increase ALT-PE, it would seem that such an intervention would be appropriate.

Summary

Academic engaged time has been considered an important variable in education and has been viewed in a variety of ways. Morrison and his colleagues centered their studies on student attention. Bloom and Stallings and Kaskowitz investigated essentially the same behavior, calling it student engagement or engaged time. Rosenshine and Berliner extended the term a bit more and labeled it student engaged academic time (SEAT). The factor of a high student success rate on the task at hand was combined with SEAT to form academic learning time (ALT). The researchers all viewed student engagement with academic materials as educationally sound.

More recently, process-product research has demonstrated significant positive relationships between engaged time and student achievement. More specifically, a positive correlation has been reported between ALT and student achievement. ALT has since been used as an ongoing measure of student achievement.

Investigators from two research programs have used ALT and opportunity to respond as dependent variables. Interventions to increase students' opportunities to
respond were conducted at the Juniper Garden Research Project at the University of Kansas. Techniques from the BTES project were developed to increase ALT. It can be concluded that a variety of methods may be employed to increase ALT.

An instrument to measure ALT in physical education settings was developed at The Ohio State University. ALT-PE was described in public school settings and evidence was provided to support the notion that interventions are needed to improve ALT-PE.

Feedback has been demonstrated as being an unobtrusive, cost effective means of increasing a variety of behaviors in a variety of settings. Feedback has been used effectively in special education, regular classrooms, student teaching experiences, and in sport and physical education environments. Increases have been evidenced in teacher feedback, the amount of practice time, students' productive use of time, work rates of swimmers, and other behaviors from the use of feedback.

The current investigation uses feedback to teachers and students in an attempt to increase ALT-PE. Feedback was chosen due to its ease of implementation and the evidence of its effectiveness across settings.
CHAPTER III

METHODS AND PROCEDURES

The procedures of this study were developed in an attempt to answer the research question stated in Chapter I, p. 4:

Can students' Academic Learning Time-Physical Education be increased by daily monitoring and providing graphic feedback to the in-service teacher and/or students?

Chapter III will be divided into the following categories: subjects and setting, subject selection, materials, observational procedure, observer training, reliability, reactivity, stages of the study, experimental design, and analysis of the data.

Subjects and Settings

The subjects were twelve public school physical education students at four separate schools in the Columbus, Ohio, area. Three students at each school were observed in their daily physical education class for six weeks from February to the middle of March, 1980. The subjects included two male seventh graders, one female seventh grader, eight female tenth graders, and one male tenth grader.
Class One

Three female students served as subjects in this urban high school setting. This is the initial year of busing for desegregation at this school. The physical education class observed was the second period of the school day, beginning at 9:15 a.m. The class was 40 minutes in duration with 5 minutes at either end for changing clothes; thus, there were 30 minutes actually allocated for activity. The class consisted of 27 females taught by a female teacher with 5 years of public school experience. There was a male class of comparable size being conducted simultaneously. The students were given the choice of the activity in which they desired to participate. Thus, activities could be coeducational. In actuality only one activity (volleyball) was coed. Instruction occurred on Monday through Thursday. On Friday, students were given a free choice day with a variety of activities occurring.

Volleyball was the first activity taught. The males and females were combined. Three courts were available for approximately 50 students. Two balls per court were used during practice settings. Games were organized during the second week of volleyball. This unit was conducted over an 11-day period.

From the 12th day to the 20th day, the females were participating in a modern dance unit. The males were
wrestling. The male and female classes were conducted separately. The dance unit was conducted in a small gym about half the size of a basketball court. This gym is separate from other activity areas so there were no distractions from other classes during this unit.

The female students participated in badminton for the duration of the observational period. Three badminton courts were assembled in the same gym that the dance unit had been conducted. There were sufficient racquets and birds for each student to participate.

**Class Two**

Class two is in a school that has been described as an urban/suburban high school as it has characteristics of both. Generally, students are lower middle class with many transients. Forty percent of the students come from one-parent families, with less than 10% of the parents having a college education.

One male and two females served as subjects from a coed class of 27 students (16 females and 11 males). The class was taught the first period of the day, beginning at 7:55 a. m., by a female teacher with 5 years of public school experience. First period was 55 minutes in duration with 5 minutes on either end of the class to change; thus, the class had 45 minutes allotted to activity. The gymnasium was the size of two basketball courts. The class
that participated in this study was allotted half of the gymnasium. A separate class was conducted on the other half of the gymnasium. Instruction took place Monday through Friday.

Basketball was the subject matter for the first 17 days of observation. The class had three baskets to use for practice and there were enough basketballs so that every two people could share. The daily routine during this activity started with warm-ups, then a shooting drill and on to ball handling drills. The last week, students were playing the actual game of basketball or a variation of the game.

From day 18 of the study until its conclusion, the class participated in gymnastics. Four tumbling mats, one crash pad, one balance beam, and a trampoline were available for use. The daily procedure consisted of a 10-minute warm-up, then the students lined up for stunts and tumbling on the mats for 10 to 12 minutes, and moved on to stations at the beam, trampoline, or mats for the duration of the period.

Class' Three

Class three was in a middle class suburban middle school. One female and two male seventh graders served as subjects. The class consisted of 50 students (24 males and 26 females). A male teacher with 8 years of
experience taught in this setting with the assistance of two Ohio State University students. This class was the first period of the day and began at 10:05. The period was 45 minutes in duration with 5 minutes on either end for changing clothes, thus leaving 35 minutes allotted for activity.

The students were assigned to physical education for a 6-week period. The observers entered the setting during the second week of the class and remained throughout the next 5 weeks. Gymnastics was the subject matter for the entire study. Instruction occurred from Monday through Friday each week.

Gymnastics equipment was assembled throughout the gymnasium. This equipment included one trampoline, one wrestling mat used for tumbling, two vaulting horses, one set of parallel bars, one set of uneven bars, one horizontal bar, and a balance beam. All equipment had mats underneath as protection from falls.

Daily routine included a self warm-up period until all students arrived at which time the class would line up for attendance check. Following attendance check, the class assembled for discussion of the day's activity, then they would go to their stations for practice. Students were to spot for each other. At the end of class, the students assembled once again for teacher comments before being dismissed. Two days were used for activities other
than practice. One day was an exhibition by the high school team and another was used for a written quiz and films.

Class Four

Thirty-four students comprised this class at an inner city school. As with school one, this was the initial year of busing for desegregation purposes. Most students come from a low socio-economic class. This class was characterized by poor attendance, with an average of less than 24 of the 36 students in attendance daily. Three female tenth graders served as subjects.

Two teachers, one male and one female, with more than 10 years experience each, team-taught this class. The class was the second period of the day beginning at 9:15 a. m. and lasting 40 minutes. Five minutes were allotted on either end of the class for changing clothes, thus leaving only 30 minutes of time allocated for activity. The gymnasium consisted of floor space the size of two basketball courts.

Three activities were taught during the 7 weeks of the observations. Badminton and table tennis were taught in combination through the first 15 days. One badminton court was set up with about eight students hitting at once. Six table tennis tables were available
with enough equipment to keep the balance of the class busy. Students started the day in this unit by doing fitness exercises, running laps, and then lining up for attendance check. Game play followed attendance check.

Basketball was conducted the next 2 weeks. Two full courts were available. Six balls were used during warm-up, then the students would play full court games.

Volleyball was the activity that concluded the observational period. This occurred from day 26 through day 34. Two volleyball courts were used for game play each day. Students lined up for attendance check, then moved to the assigned court for games.

Subject Selection

Teachers participating in the study were selected on the basis of mutual acquaintances and willingness to participate. The class periods were chosen for ease of scheduling observers' time.

The students were selected at random after meeting two criteria. First, all students were told that observers would categorize how they spent their time in physical education and were asked to give consent to be observed (See Appendix C). Those who did not sign the consent forms were not in the random selection. Fifteen students in each of classes one, two, and four signed the forms. All students but five signed the consent forms in class
three. Second, the students could not have been absent more than five times during the previous semester to be eligible for selection. In class one, 11 were eligible for selection as were 14 in class two. Forty-five were eligible for selection in class three with only six in class four. The actual students being observed were not aware that they were the target subjects.

**Dependent Variables**

The dependent variables are those variables that are intervened upon in order to observe the effect of the independent variable upon them. In this investigation, the independent variable was introduced in an attempt to increase the occurrence of the dependent variables.

The dependent variables are as follows:

1. **Content-Physical Education** - the percent of intervals that the class is involved in physical education content.

2. **Engaged time** - the percent of intervals in which the target student is appropriately engaged in the physical education content.

3. **Motor response** - the percent of intervals in which the target student is performing a motor skill related to the appropriate physical education content.

4. **ALT-PE** - the percent of intervals in which the target student is engaged at an easy difficulty level.

5. **ALT-PE(M)** - the percent of intervals in which the target student is motorically engaged at an easy difficulty.
Teacher behavior was monitored to observe any changes that may have occurred due to intervention. Teacher behavior was not directly intervened upon, but is treated as a dependent variable in the data summary.

1. Observing - the percent of intervals in which the teacher maintained eye contact with the students but no verbal instruction was delivered.

2. Active Instruction - The percent of intervals in which the teacher was actively instructing the class, either by lecturing, providing feedback, hustles, modeling, listening, or asking and answering questions.

3. Managing Students and the Environment - The percent of intervals in which the teacher was "setting the stage" for the class either by giving directions, maintaining equipment, check role, and praising or punishing students.

**Observation Instrument**

The observation instrument employed for this study was the system used by Metzler (1979) with the addition of a system to monitor teacher behavior (Figure 1). The teacher behavior scale is a modification of that used by Friedman (1978). The development of the instrument and testing of the representativeness of the timing procedures has been reported by Metzler.

The same three students were observed daily during one class on a sequential basis. Student one was observed for 6 seconds, then 6 seconds was allowed for recording the data and locating the second student. The same time
span was employed for observing and recording the second and third students. After recording the data of the third student, the first student was found and the process was repeated. This method ensures the best representation of student behavior throughout the class (Thomson, Holmberg, & Baer, 1974).

One of the setting categories and one of the content categories were recorded of each of the intervals (see Figure 1). If a general content category was recorded, then no further coding was required during the interval. If a physical education content was observed, then the coder must make a decision on the learner moves level. At this level the student was either engaged or not engaged. If the student was not engaged then no further coding was required. If the student was engaged, a difficulty level had to be assigned.

A teacher behavior was assigned for every interval. The teacher was observed just before the interval begins. The teacher behavior occurring on the cue to observe was recorded. Thus, teacher behavior was recorded every 12 seconds.

For definitions of each category, see the training manual in Appendix A.
ALT-PE TEACHER BEHAVIOR OBSERVATION SYSTEM

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**Figure 1:** Sample of the Observation Instrument
Materials

Observers were equipped with an audio cassette tape recorded and a pre-recorded audio tape with instructions as to the timing of when to observe and when to record. A second cassette tape was provided in case the first tape malfunctioned. Ear jacks were provided for each observer to remove the possibility of the tape distracting the teacher and students. A double ear jack was used during reliability sessions to ensure that both observers were observing and recording simultaneously. The double ear jack also served to separate the observers 3 to 6 feet to help ensure independence of observations.

Observational Procedure

Observers were to begin coding 5 minutes after the beginning of the period. This is the time that all teachers indicated the activity was to begin. Coding ended when class was dismissed. Coding was continuous with the exception of approximately a 1-minute break about two thirds through the class in order to rewind the audio tape.

In case of student absence, observers were instructed to use the same time reference for students observed, rather than observe the target students that were present, more often. This gives consistency of the data throughout the study.
Observers would seat themselves in an unobtrusive area of the gymnasium and remain there throughout the observation period.

Observer Training

In order to ensure reliability from the start of the study, training of the four observers assisting in the study was conducted over 4 weeks, three times per week. Each session lasted between 1 and 1½ hours. A sequence of materials was organized that would gradually shape the reliability of each observer (see Appendix B). The training manual is an adaptation of that used by Metzler (1979).

The training procedures followed four phases. The observers were first provided with the definitions of the behaviors to be observed. Written transcripts were then coded and discussed. Three videotapes were made for the purposes of training the observers. Each observer viewed the tapes and coded ALT-PE. Observers met reliability criteria on two successive tapes. Finally, observers went to field settings and met the reliability criteria on two successive observations. Reliability criteria and calculation will be discussed in the next section. Total training time took 10 to 14 hours depending upon the previous experience of the observer.

One formal retraining session occurred approximately 4 weeks into the study to minimize observer drift. This consisted of a meeting in which examples and definitions
were discussed. At times during the course of the study, observers questioned the categorization of an unusual instance. Discussion ensued and decisions were made known to all observers so that observations would be consistent across time.

**Reliability**

One essential step of ensuring internal validity in single subject research is to ensure that data are reliable. Reliability, in this context, is defined as the degree to which two independent observers agree on the occurrence or non-occurrence of the operationally defined behaviors. In other words, the question becomes, "Are the two observers seeing the same behaviors at the same time?" The interval recording system used has a decided advantage over other recording systems. Due to the timing element of the coding strategy, observers are observing and coding in the same time frame, so one can be more certain that behaviors observed and recorded were the same behaviors.

However, the calculation issues involved in interval recording have been a topic of discussion (Birkimer & Brown, 1978; Hawkins & Dotson, 1975; Johnson & Bolstad, 1973). Hawkins and Dotson (p. 376) argue that the method used should depend mostly upon the amount of behavior occurring. Scored interval (S-I) reliability should be used for low frequency behaviors due to the fact that it will be a more stringent reliability measure. The ALT-PE
instrument has many more decisions than simply occurrence or non-occurrence of a behavior. For this reason, the odds of one behavior becoming spuriously high are remote. Therefore, because scored interval reliability is the most stringent, it shall be reported in this study.

Scored interval reliability was calculated for each behavior reported in the study. The procedure begins by eliminating any interval in which the target behavior was not scored by both observers. Next, the agreements and the disagreements are counted and reliability is calculated according to the following formula:

\[
S-I = 100 \times \frac{\text{Agreement}}{\text{Agreement} + \text{Disagreement}}
\]

An agreement is an interval in which both observers scored the behavior, whereas a disagreement is an interval in which only one observer scored the behavior.

The frequency of behaviors recorded may be extremely variable across categories. When setting criteria level for acceptance for reliability, flexibility is indicated because of this problem (Birkimer & Brown, p. 27). Therefore, the criteria level of acceptance for the scored interval reliability shall be as follows (Metzler, 1979):

1. When the number of intervals was five or less, the acceptable percentage of S-I agreement was 60%;

2. When the number of intervals was from six to ten, the acceptable percentage of S-I agreement was 70%; and
3. When the number of intervals was eleven or more, the acceptable percentage of S-I agreement was 80%.

Reliability tables are presented with the S-I percentages along with the actual number of agreements and number of intervals in which the behavior was recorded.

Several authors have suggested graphically reporting the data of the primary observer and the reliability observer (Birkimer & Brown, 1979; Hawkins & Dotson, 1975; Morris, Rosen, & Clinton, 1975). These authors advocate this method as a means for helping the reader assess the believability of the experimental effects. This recommendation has not gone uncriticized (Kratochwill, 1979). One problem in plotting both observers' data together is that they may appear to be in close agreement; whereas, in reality, the intervals were coded very differently.

This investigator has chosen to graphically portray the data from both observers in order for the reader to make easy preliminary judgments on reliability. The S-I reliability tables are also reported for a more stringent analysis of reliability.

Several other procedures were used to ensure reliable data collection.

1. **Training of observers**: All observers completed two consecutive reliability checks at the specified criteria in the
field setting in advance of baseline measurement for the study.

2. **Retraining of observers:** Observers met for a formal retraining discussion during the fourth week of the study. This was an effort to guard against observer drift.

3. **Rotation of observers:** Observers were rotated across each of the four settings. No observer was in the same class more than twice per week. This was an attempt to avoid consensual drift among observers.

4. **Reliability checks across phases:** A minimum of two reliability checks were conducted during each phase at each setting and with each observer.

5. **Investigator collected no data:** The investigator was never the primary observer during the study.

6. **Designated reliability observer:** The investigator and one trained observer collected reliability estimates.

Reliability percentages are presented in Chapter IV of the study.
Reactivity

Reactivity refers to a behavior change of the clients or observers due to a change or an expected change in the environmental conditions. Reactivity can occur in the form of observee reactivity, either teachers or students, or observer reactivity.

If the subjects are aware that they are being observed and aware of the nature of the observations their behavior may be subject to change. To minimize the potential for this occurrence the baseline period was of sufficient length to acclimate the subjects to the observer. The students were naive to the exact nature of the observations and the observers sat off to the side of the activity area. The teachers did know the identity of the subjects and were asked not to react to the target students differently than they would normally. The investigator has no reason to believe that differential responding by the teacher to target students occurred as a result of the study.

Observer reactivity occurs when the observer changes coding behavior due to expected treatment conditions. Attempts were made to minimize this by keeping observers naive as to the timing and purposes of interventions. The investigator was never the primary observer and reliabilities were checked across all phases of the study.
Stages of the Study

Baseline

The baseline phase was recorded from the beginning of the observational period until feedback was provided as an independent variable in an attempt to improve ALT-PE.

Prior to baseline measurements the classes were informed that the observers would be in the gymnasium for the next 6 to 7 weeks observing the way students spent time in physical education classes and would work with the teacher to help bring improvement in the way time was spent. Students then signed an informed consent form giving permission to be observed. Teachers had been shown the observational instrument and were explained the rationale underlying the Academic Learning Time research program. Baseline was then measured without any other special arrangements, but with the understanding that some change from prior teacher and/or student behavior may have occurred due to the teacher's and students' knowledge of the nature of the observation being conducted.

Intervention with the Teacher

Timing of the intervention was of critical importance. All interventions had to begin during a unit of instruction (i.e., volleyball, basketball), preferably as close to the middle as possible. If intervention had come at the beginning of a unit it may not be possible to explain if the behavior change was due to the intervention or to the
change in activity. Interventions were also attempted to begin when the behavior showed stability or a trend opposite the desired direction. However, this was not always possible due to the time limitation of the activity.

Feedback to the teacher constituted the first intervention. The teachers were given, once again, the definition of terms, an explanation of what each graph meant, and were informed of the data of each student. The teachers were able to identify the data of each student, although no names were used. Graphic feedback on content physical education (Figure 2), engaged time (Figure 3), motor response time (Figure 4), ALT-PE (Figure 5), and ALT-PE(M) (Figure 6) was provided to the teacher daily.

The procedures for accomplishing this were as follows:

1. The graphs were initially drawn for the teachers, depicting the data of the students in the class.
2. Each teacher was taught how to graph the data.
3. The observers returned the observational sheets to the investigator by noon each day throughout the course of the study.
4. The investigator totaled the data during the afternoon and telephoned each teacher in order to report the results and have the teacher graph the data.
5. The investigator made periodic visits throughout the study to ensure the data had been graphed correctly.

Teachers were made aware that more engaged time and motor responses were desirable. The motor response aspect was stressed. The exact nature of how to achieve this was
Figure 2: An Example of Graphic Feedback on Content Physical Education
Figure 3: An Example of Graphic Feedback on Engaged Categories
Figure 4: An Example of Graphic Feedback on the Motor Response Category
Figure 5: An Example of Graphic Feedback on ALT-PE

Percent of Intervals of ALT-Pe

Days

Subject No. 3

Subject No. 2

Subject No. 1

Baseline Graphic Feedback to Teachers
Figure 6: An Example of Graphic Feedback on ALT-PE(M)
left to the teachers. Daily feedback to the teachers continued throughout the study.

**Intervention with the Students**

Intervention with the students constituted the final phase of the study. This phase proceeded as follows:

1. At the end of class the day before this phase was set to start, the teacher explained to the students that more motor attempts were desirable in order to learn the skill. The operational definition that the observers were using was explained. Examples and non-examples of motor responding were provided to the students. The interval recording system was briefly explained so that each student was aware of how the responses were coded.

2. A bar graph depicting the percent of intervals of motor responses for the class was posted for the class to see each day (Figure 6). The class motor response level was calculated by averaging the motor response level of the three students observed.

3. The teachers informed each class that their goal should be to increase the frequency of the motor responses during each class to a level as high or higher than previous levels. No contingencies were tied to obtaining that motor response level.

4. The investigator informed the teacher of the class motor response level during the daily phone call. The investigator checked the bar graphs during the periodic visits.

This feedback was provided each day from the point of intervention until completion of the study.
Figure 7: An Example of Graphic Feedback on Motor Responses for the Class
Experimental Design and Analysis of Data

Experimental Design

Experimental analysis was conducted via a multiple baseline design across the four school settings. This design was chosen because of the desire to use the same independent and dependent variables in several settings. Baer, Wolf, and Risley (1968) first reported the techniques of using the multiple baseline design. The design has since become widely used in single subject research.

A multiple baseline design may be implemented in three ways: across behaviors, across subjects, or across settings. The use of this design across the four school settings was deemed most appropriate.

The multiple baseline design is one in which intervention occurs in one setting while all others remain in baseline. Then, the same intervention is applied in the second setting with succeeding settings remaining in baseline and so on. The baselines serve as controls for the data in the preceding setting. A functional relationship would be demonstrated if the dependent variable changes in the desired direction and at the desired levels at the time of the intervention in each setting.

Four settings would be sufficient to constitute clear and convincing evidence of the functional relationship between the dependent and independent variables. Four settings were chosen for two reasons: (a) the amount of
literature pertaining to the use and effectiveness of feedback as an intervention technique makes more replications of the technique unnecessary for convincing evidence in study (Sidman, 1960) and (b) it was logistically impossible to observe daily in more settings due to the limited number of people able to observe during the study.

Analysis of Data

Data are presented by graphs in Chapter IV as percent of intervals in which the behaviors occurred. This was calculated by dividing the total frequency for each behavior by the total number of intervals observed for each subject each day and then multiplying by 100. The percentage of occurrence for each of the behaviors was graphed.

At the completion of the second intervention, the data were evaluated via the multiple baseline design to determine relative effectiveness of the feedback intervention. Significance would be demonstrated if the dependent variables in subsequent phases had improved such that there was little or no overlap with previous phases of the study.
CHAPTER IV

ANALYSIS AND DISCUSSION OF THE DATA

This chapter will describe the results of the study, showing the effects of interventions on ALT-PE. Reliability of the observations will be reported, followed by a report on the ALT-PE of each of the students.

Reliability

As a part of establishing internal validity, observers were checked for reliability throughout the investigation. Each observer was checked a minimum of two times during each phase of the study. The checks were conducted so that reliability was also collected twice in each setting during each phase of the study. All reliability tables represent the scored-interval method of determining reliability as discussed in Chapter III.

The degree to which data are reliable is influenced by several factors. One is the frequency of the behavior being recorded. Other factors are observer training and the complexity of the instrument being used to record observations.
The greater the frequency of any given behavior, the more likely it is that the reliability percentage will be high. This is particularly reflected in the scored-interval method of calculating reliability. The scored-interval method is the most stringent method of calculating reliability with low frequency behaviors. This was the reason for the step-wise criterion levels as outlined in Chapter III.

Observer training has been detailed in Chapter III, and the training manual can be found in Appendix B. All coders were required to complete two videotapes and two live codings before coding for the investigation. Table 1 represents the mean reliabilities of the categories reported across all observers at the end of the training sessions.

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>VIDEO 1</th>
<th>VIDEO 2</th>
<th>LIVE 1</th>
<th>LIVE 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content PE</td>
<td>97</td>
<td>96.2</td>
<td>94.3</td>
<td>98</td>
</tr>
<tr>
<td>Engaged Time</td>
<td>92.2</td>
<td>91.5</td>
<td>87.3</td>
<td>93.4</td>
</tr>
<tr>
<td>Motor Response</td>
<td>87.7</td>
<td>90</td>
<td>83.3</td>
<td>88.9</td>
</tr>
<tr>
<td>ALT-PE</td>
<td>91.1</td>
<td>90.5</td>
<td>86.8</td>
<td>92</td>
</tr>
<tr>
<td>ALT-PE(M)</td>
<td>83.4</td>
<td>85</td>
<td>79.6*</td>
<td>83.2</td>
</tr>
</tbody>
</table>

**Teacher Behaviors**

- Active Instruction: 82.2 78.6* 81 84.5
- Managing Students and Environment: 85.7 88.2 84.3 86.2
- Observing: 80.3 82.2 76.4* 73.2*

*Denotes a percentage below criterion level.
The complexity of the instrument is related to the number of categories from which a coding decision must be made. Thus the more categories, the greater is the possibility that observers will differ in the behavior coded, and the fewer categories from which to choose, the greater is the possibility of agreement. Hawkins and Dotson (1975) referred to this as the chance level of agreement and suggested that the chance level be reported for any interval recording system to further clarify reliability percentages reported. The chance level of agreement is determined by dividing the total number of categories in any one level into one and multiplying by 100. Although observations were conducted as outlined in the training manual (Appendix B), many categories were combined for the purpose of reporting the results. The chance level of agreements are reported on these combinations as are the reliability percentages. The chance levels of agreement for the ALT-PE recording system at each decision level for the combined categories are: content level, 50%; engaged time, 50%; motor responding 16.6%; difficulty level affecting ALT-PE and ALT-PE(M), 33.3%; teacher behaviors, 20%.

Tables 2 through 5 represent the reliabilities for each observer throughout the course of the investigation.
TABLE 2
PERCENT OF SCORED-INTERVAL RELIABILITY FOR OBSERVER 1

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>BASELINE</th>
<th>INTERVENTION 1</th>
<th>INTERVENTION 2</th>
<th>TOTAL FOR ENTIRE STUDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content-Physical</td>
<td>95.6%</td>
<td>96.2%</td>
<td>99.4%</td>
<td>97.0%</td>
</tr>
<tr>
<td>Education</td>
<td>155/162</td>
<td>230/239</td>
<td>175/176</td>
<td>560/577</td>
</tr>
<tr>
<td>Engaged Time</td>
<td>85.7%</td>
<td>78.1%</td>
<td>91.2%</td>
<td>85.1%</td>
</tr>
<tr>
<td></td>
<td>48/56</td>
<td>43/55</td>
<td>52/57</td>
<td>143/168</td>
</tr>
<tr>
<td>Motor Response</td>
<td>83.3%</td>
<td>83.8%</td>
<td>90.0%</td>
<td>85.7%</td>
</tr>
<tr>
<td></td>
<td>25/30</td>
<td>26/31</td>
<td>27/30</td>
<td>78/91</td>
</tr>
<tr>
<td>ALT-PE</td>
<td>92.0%</td>
<td>80.0%</td>
<td>80.4%</td>
<td>80.9%</td>
</tr>
<tr>
<td></td>
<td>41/50</td>
<td>28/35</td>
<td>37/46</td>
<td>106/131</td>
</tr>
<tr>
<td>ALT-PE(M)</td>
<td>72.0%*</td>
<td>63.1%*</td>
<td>85.0%</td>
<td>73.4%*</td>
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<tr>
<td></td>
<td>18/25</td>
<td>12/19</td>
<td>17/20</td>
<td>47/64</td>
</tr>
<tr>
<td>TEACHER BEHAVIOR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active Instruction</td>
<td>80.0%</td>
<td>63.1%*</td>
<td>68.1%*</td>
<td>73.6%*</td>
</tr>
<tr>
<td></td>
<td>40/50</td>
<td>12/19</td>
<td>15/22</td>
<td>67/91</td>
</tr>
<tr>
<td>Managing Students</td>
<td>81.2%</td>
<td>85.5%</td>
<td>90.6%</td>
<td>85.5%</td>
</tr>
<tr>
<td>and Environment</td>
<td>169/208</td>
<td>231/270</td>
<td>155/171</td>
<td>555/649</td>
</tr>
<tr>
<td>Observation</td>
<td>64.1%*</td>
<td>58.6%*</td>
<td>70.5%*</td>
<td>63.7%*</td>
</tr>
<tr>
<td></td>
<td>43/67</td>
<td>17/29</td>
<td>12/17</td>
<td>72/113</td>
</tr>
</tbody>
</table>

*Denotes a percentage below criterion level.
<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>BASELINE</th>
<th>INTERVENTION 1</th>
<th>INTERVENTION 2</th>
<th>TOTAL FOR ENTIRE STUDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content-Physical</td>
<td>96.8%</td>
<td>100.0%</td>
<td>98.2%</td>
<td>98.2%</td>
</tr>
<tr>
<td>Education</td>
<td>152/157</td>
<td>142/142</td>
<td>280/285</td>
<td>574/584</td>
</tr>
<tr>
<td>Engaged Time</td>
<td>88.6%</td>
<td>96.2%</td>
<td>95.1%</td>
<td>93.9%</td>
</tr>
<tr>
<td></td>
<td>78/88</td>
<td>104/108</td>
<td>178/187</td>
<td>360/383</td>
</tr>
<tr>
<td>Motor Response</td>
<td>88.2%</td>
<td>90.0%</td>
<td>85.8%</td>
<td>87.2%</td>
</tr>
<tr>
<td></td>
<td>30/34</td>
<td>36/40</td>
<td>85/99</td>
<td>151/173</td>
</tr>
<tr>
<td>ALT-PE</td>
<td>86.7%</td>
<td>88.7%</td>
<td>90.0%</td>
<td>89.0%</td>
</tr>
<tr>
<td></td>
<td>59/68</td>
<td>79/89</td>
<td>162/180</td>
<td>300/337</td>
</tr>
<tr>
<td>ALT-PE(M)</td>
<td>64.0%*</td>
<td>81.4%</td>
<td>80.0%</td>
<td>77.4%*</td>
</tr>
<tr>
<td></td>
<td>16/25</td>
<td>22/27</td>
<td>72/90</td>
<td>110/142</td>
</tr>
<tr>
<td>TEACHER BEHAVIOR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active Instruction</td>
<td>73.1%*</td>
<td>0.0%*</td>
<td>78.4%*</td>
<td>76.4%*</td>
</tr>
<tr>
<td></td>
<td>30/41</td>
<td>0/2</td>
<td>113/144</td>
<td>143/187</td>
</tr>
<tr>
<td>Managing Students and Environment</td>
<td>77.9%*</td>
<td>84.3%</td>
<td>91.1%</td>
<td>84.6%</td>
</tr>
<tr>
<td></td>
<td>46/59</td>
<td>129/153</td>
<td>62/68</td>
<td>237/280</td>
</tr>
<tr>
<td>Observation</td>
<td>72.2%*</td>
<td>66.7%*</td>
<td>70.0%*</td>
<td>70.2%*</td>
</tr>
<tr>
<td></td>
<td>13/18</td>
<td>12/18</td>
<td>41/58</td>
<td>66/94</td>
</tr>
</tbody>
</table>

*Denotes a percentage below criterion level.
### TABLE 4

PERCENT OF SCORED-INTERVAL RELIABILITY FOR OBSERVER 3

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>BASELINE</th>
<th>INTERVENTION 1</th>
<th>INTERVENTION 2</th>
<th>TOTAL FOR ENTIRE STUDY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content-Physical</strong></td>
<td>94.4%</td>
<td>93.5%</td>
<td>95.6%</td>
<td>94.4%</td>
</tr>
<tr>
<td></td>
<td>154/163</td>
<td>173/185</td>
<td>154/161</td>
<td>481/509</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td>154/163</td>
<td>173/185</td>
<td>154/161</td>
<td>481/509</td>
</tr>
<tr>
<td></td>
<td>86.3%</td>
<td>91.2%</td>
<td>96.1%</td>
<td>91.3%</td>
</tr>
<tr>
<td></td>
<td>82/95</td>
<td>125/137</td>
<td>99/103</td>
<td>306/335</td>
</tr>
<tr>
<td><strong>Engaged Time</strong></td>
<td>86.3%</td>
<td>91.2%</td>
<td>96.1%</td>
<td>91.3%</td>
</tr>
<tr>
<td></td>
<td>82/95</td>
<td>125/137</td>
<td>99/103</td>
<td>306/335</td>
</tr>
<tr>
<td><strong>Motor Response</strong></td>
<td>75.6%*</td>
<td>90.3%</td>
<td>88.8%</td>
<td>85.7%</td>
</tr>
<tr>
<td></td>
<td>31/41</td>
<td>75/83</td>
<td>8/9</td>
<td>114/133</td>
</tr>
<tr>
<td><strong>ALT-PE</strong></td>
<td>83.3%</td>
<td>93.0%</td>
<td>98.9%</td>
<td>92.8%</td>
</tr>
<tr>
<td></td>
<td>50/60</td>
<td>107/115</td>
<td>90/91</td>
<td>247/266</td>
</tr>
<tr>
<td><strong>ALT-PE(M)</strong></td>
<td>61.5%*</td>
<td>86.3%</td>
<td>100.0%</td>
<td>83.3%</td>
</tr>
<tr>
<td></td>
<td>8/13</td>
<td>63/73</td>
<td>4/4</td>
<td>75/90</td>
</tr>
<tr>
<td><strong>TEACHER BEHAVIOR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active Instruction</td>
<td>88.6%</td>
<td>85.2%</td>
<td>66.7%*</td>
<td>83.7%</td>
</tr>
<tr>
<td></td>
<td>47/53</td>
<td>52/61</td>
<td>14/21</td>
<td>113/135</td>
</tr>
<tr>
<td>Managing Students</td>
<td>88.2%</td>
<td>81.1%</td>
<td>94.3%</td>
<td>90.1%</td>
</tr>
<tr>
<td>and Environment</td>
<td>128/145</td>
<td>56/69</td>
<td>201/213</td>
<td>385/427</td>
</tr>
<tr>
<td>Observation</td>
<td>72.0%*</td>
<td>76.5%*</td>
<td>73.5%*</td>
<td>73.8%*</td>
</tr>
<tr>
<td></td>
<td>49/68</td>
<td>36/47</td>
<td>25/34</td>
<td>110/149</td>
</tr>
</tbody>
</table>

*Denotes a percentage below criterion level.
<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>BASELINE</th>
<th>INTERVENTION 1</th>
<th>INTERVENTION 2</th>
<th>TOTAL FOR ENTIRE STUDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content-Physical Education</td>
<td>94.1%</td>
<td>96.7%</td>
<td>97.5%</td>
<td>95.5%</td>
</tr>
<tr>
<td></td>
<td>383/407</td>
<td>172/178</td>
<td>198/203</td>
<td>753/788</td>
</tr>
<tr>
<td>Engaged Time</td>
<td>81.2%</td>
<td>93.3%</td>
<td>94.8%</td>
<td>88.9%</td>
</tr>
<tr>
<td></td>
<td>160/197</td>
<td>126/235</td>
<td>147/155</td>
<td>433/487</td>
</tr>
<tr>
<td>Motor Response</td>
<td>84.4%</td>
<td>93.2%</td>
<td>93.0%</td>
<td>87.5%</td>
</tr>
<tr>
<td></td>
<td>98/116</td>
<td>26/32</td>
<td>93/100</td>
<td>217/248</td>
</tr>
<tr>
<td>ALT-PE</td>
<td>86.7%</td>
<td>90.3%</td>
<td>88.9%</td>
<td>88.5%</td>
</tr>
<tr>
<td></td>
<td>111/128</td>
<td>84/93</td>
<td>113/127</td>
<td>308/348</td>
</tr>
<tr>
<td>ALT-PE(M)</td>
<td>82.5%</td>
<td>80.0%</td>
<td>85.5%</td>
<td>83.5%</td>
</tr>
<tr>
<td></td>
<td>66/80</td>
<td>16/20</td>
<td>65/76</td>
<td>147/176</td>
</tr>
<tr>
<td>TEACHER BEHAVIOR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active Instruction</td>
<td>82.1%</td>
<td>92.7%</td>
<td>78.9%*</td>
<td>85.4%</td>
</tr>
<tr>
<td></td>
<td>83/101</td>
<td>90/97</td>
<td>45/57</td>
<td>218/255</td>
</tr>
<tr>
<td>Managing Students and Environment</td>
<td>81.6%</td>
<td>94.9%</td>
<td>64.2%*</td>
<td>83.1%</td>
</tr>
<tr>
<td></td>
<td>223/273</td>
<td>75/79</td>
<td>18/28</td>
<td>316/380</td>
</tr>
<tr>
<td>Observation</td>
<td>70.8%*</td>
<td>88.8%</td>
<td>92.0%</td>
<td>81.3%</td>
</tr>
<tr>
<td></td>
<td>68/96</td>
<td>40/45</td>
<td>58/63</td>
<td>166/204</td>
</tr>
</tbody>
</table>

*Denotes a percentage below criterion level.
Discussion of Reliability

The majority of the reliability scores were well within the criterion level. A few of the reliabilities of the ALT-PE(M) category fell well below criterion. This was due to the small frequency of occurrence of that category during each class. It is concluded that the observations on the ALT-PE categories produced reliable data.

The teacher behavior agreements were much lower than the ALT-PE agreements. The category of managing students and environment generally met acceptable standards due to the high frequency of occurrence. Active instruction and observing categories frequently did not meet the criterion level. The percentages are in the seventies, however. The data are presented with the awareness of this limitation. One reason that the reliabilities may be lower for the teacher behaviors is the time sampling format. In all likelihood, the disagreements are due to timing problems rather than definitional problems. In the future, a 6-second interval should be allocated to observe the teacher, also.

Summary of the Data

Content-Physical Education

Figure 7 shows the content-physical education category across all four settings and in all phases of the study. Settings one and two did have an upward trend
through much of the investigation. The mean baseline for setting one is 76.1% and for setting two is 79.3%. During feedback to the teacher, the mean of content-physical education improves in setting one to 87.5% and to 82.1% in setting two. The mean during the final phase is 90.2% in setting one and 91.9% in setting two. Overlap of data points between phases is evident in Figure 8.

Setting three has a mean baseline of 81.5%. This drops to a mean of 76.4% during phase two and climbs back to a mean of 81% during the final phase. Setting four has a mean of 76% during baseline, 89.1% during phase two, and 63% during the final phase.

All settings are characterized by variability and overlap of data points between phases. Content-physical education ranges from 50% and 98% and averages 82% across the four school settings.
Figure 8: Content Physical Education

Days

Percent of Intervals of Content-PE
Engaged Time

The engaged time for each of the twelve subjects is presented in a multiple baseline analysis in Figures 9 through 11. Once again these data are characterized by variability. In two settings, significant changes occur when activities change, rather than with the intervention.

Subjects one, two, and three all show improvements in the mean of their engaged time in successive phases. Subject one goes from a mean of 42.1% of engaged time during baseline, to a mean of 53.2% during the first intervention, and to a mean of 70.2% during the final phase. Subjects two and three follow a similar pattern. Alone, these figures indicate that the interventions may have been effective in improving the engaged time. However, a closer examination reveals that changes in engaged time occur with changes in activity. After the first intervention, there is an initial drop in engaged time, then a substantial increase at the start of a new activity.

Improvement in engaged time is illustrated by the graphs (Figures 9 - 11) for subjects four, five, and six immediately following intervention one. This initial increase drops immediately for subjects five and six when a change of activity occurs. Subject four was absent at that time.
Subjects seven, eight, and nine remain in the same activity throughout the investigation. The mean baseline for these three subjects is 41%, 54%, and 44.8%, respectively. The mean engaged time falls after the initial intervention to 30.6%, 45.4%, and 21%. The mean engaged time in the final phase does not exceed that of baseline: 41%, 53.2%, and 36.4%.

The mean of the final three subjects increases following the initial intervention, but drops below baseline during the final phase.
Figure 9: Percent of Intervals of Engaged Categories, Subjects 1, 4, 7, 10
Figure 10: Percent of Intervals of Engaged Categories, Subjects 2, 5, 8, 11
Figure 11: Percent of Intervals of Engaged Categories, Subjects 3, 6, 9, 12
Motor Response

The emphasis of the interventions was to increase the amount of motor responding of the students in the class. Figures 12 through 14 represent the data of each of the students throughout the study.

Subjects one, two, and three show means of 20%, 19.2%, and 16.3% motor responding during baseline. The means of the three subjects are higher during intervention one, at 31.1%, 34.4%, and 25.8%, respectively. The final phases show even higher means of 51.6%, 46%, and 45.8%. Just as with the engaged time, the motor response category changes with the activity rather than with the interventions. An initial decrease is evident following the first intervention, with a recovery only when the activity changes.

The three subjects in the second setting show mixed results. Subject four shows an increase in the mean of motor responding in phase two (26.5% to 38.8%), but a decrease in the final phase (26.1%). The mean percent of subject five is virtually the same during baseline (16%) and during intervention one (17%), but a large increase is witnessed during the final phase (35.3%). Subject six shows great variability, but the means ascend in each succeeding phase: 16.4%, 20.8%, and 33%.

Subjects seven and eight have no change from baseline through the first intervention. Subject nine has a lower
mean during the first intervention than during baseline. All subjects show improvement during the final phase, subject seven from 12% to 20%, subject eight from 21% to 37%, and subject nine from 5% to 14%.

The three subjects in the last setting show decreases in each of the phases.
Figure 12: Percent of Intervals of Motor Responses, Subjects 1, 4, 7, 10
Figure 13: Percent of Intervals of Motor Responses, Subjects 2, 5, 8, 11
Figure 14: Percent of Intervals of Motor Responses, Subjects 3, 6, 9, 12
ALT-PE and ALT-PE(M)

ALT-PE and ALT-PE(M) are reflections of the engaged time and motor response categories, respectively. ALT-PE is all engaged time at an easy level of difficulty; ALT-PE(M) is the engaged motor response time at an easy difficulty level. ALT-PE percentages are depicted in Figures 14 through 17. ALT-PE(M) percentages are depicted in Figures 18 through 20.

As with other categories, the feedback has no effect on ALT-PE or ALT-PE(M). Setting one is the only setting in which the mean consistently rises in all phases of the study. As mentioned earlier, this is due to the change in the activity. Dance crosses phases two and three and raises the mean in each phase. Badminton is taught in phase three and has clearly higher ALT-PE and ALT-PE(M) than volleyball.

As with the engaged time, setting two has higher ALT-PE during intervention one than during baseline. A slight drop of ALT-PE is witnessed during intervention two for subjects four, five, and six. However, subjects five and six show a rise in ALT-PE(M) during the final phase.

The final two settings mirror the data depicted for engaged time and the motor response category. They are characterized by variability and overlap between phases. Setting four shows a downward trend throughout the investigation.
Figure 15: Percent of Intervals of ALT-PE, Subjects 1, 4, 7, 10
Figure 16: Percent of Intervals of ALT-PE, Subjects 2, 5, 8, 11
Figure 17: Percent of Intervals of ALT-PE, Subjects 3, 6, 9, 12
Figure 18: Percent of Intervals of ALT-PE(M), Subjects 1, 4, 7, 10
Figure 19: Percent of Intervals of ALT-PE(M), Subjects 2, 5, 8, 11
Figure 20: Percent of Intervals of ALT-PE(M), Subjects 3, 6, 9, 12
Discussion of the ALT-PE Data

The results show variability throughout the study. Overlap of data points between phases is the norm for this investigation. Only in two instances did the intervention employed seem to have a positive effect. In setting two, an improvement occurs following intervention one. At this point the teacher placed non-participants around the court to retrieve the ball quickly, thus cutting down on the non-engaged interims. The improvement subsides at the beginning of gymnastics. In setting three, the motor response category shows some improvement during the final phase. The graphic feedback prompted an increase in the students' motor attempts for a short time.

The interventions employed certainly did not demonstrate control over the target behaviors. It may be that the lack of contingencies on the teachers or students provided no incentive to change. Perhaps if contingencies are placed on teachers to create change and on students to increase motor responses, some change would occur. Another reason that the intervention may not have been successful is that the decisions on how to create change were left entirely to the teachers. No suggestions as to how to affect change in ALT-PE were provided. It is quite possible that the teachers were desirous of improving ALT-PE, but had no idea of how to accomplish it.
In only one instance was there a sharp decline in the ALT-PE data. In setting four, data during the final phases drops to a point much lower than baseline. Normal class procedure during this phase of the study was as follows: the teacher presented the data for the previous day, told the students to get into their games, and then left the room. Over 40% of the teacher behavior was non-functional. The students, left on their own, exhibited very little motor responding.

An interesting comparison can be drawn with the Metzler (1979) study. Content-physical education is an average of 82% across the four school settings in this investigation. This is about 9% higher than that found by Metzler. One reason may be that Metzler conducted observations on outdoor activities that are characterized by a great deal of transition time. The settings for this study were indoors with transitions taking less time. This concurs with a conclusion of McKenzie (1976) that management time is greater with outdoor classes. The data for all other categories were above that reported by Metzler by similar margins.

ALT-PE(M) in Each Setting

In an attempt to understand what might be done in the future to increase ALT-PE(M), the data for each of the three students in the same setting were graphed concurrently.
This investigation was conceived with the belief that students need to take better advantage of the opportunities to respond that have been provided them. If this were the case, one might reasonably expect that some students in the same class would take advantage of the opportunities and others would not. Each student's ALT-PE(M) would be different from classmates and the trends would quite likely be independent of one another. This is not the case in this investigation. Figures 21 through 24 show that when the data of classmates are graphed concurrently, their trends follow almost exactly the same pattern. Thus, the amount of motor responding seems not to be a student motivational problem.
Figure 21: Percent of Intervals of ALT-PE(M) for 3 Subjects in School 1
Figure 22: Percent of Intervals of ALT-PE(M) for 3 Subjects in School 2
Figure 23: Percent of Intervals of ALT-PE(M) for 3 Subjects in School 3
Figure 24: Percent of Intervals of ALT-PE(M) for 3 Subjects in School 4
Teacher Behavior

To provide a device for monitoring possible changes in teacher behavior during the course of the investigation, an adaptation of the Freedman (1978) system was added to the ALT-PE coding format. In order to draw comparisons with the physical education teacher behaviors reported by Anderson and Barrette (1978), further refinements have been made. Anderson and Barrette had four major headings of teacher behavior: active instruction, observing, managing students and environment, and instruction related.

Because the categories in the two systems were slightly different, direct comparison may not be made. However, when the combinations of categories are made, they are closely related. The categories in the system used for this investigation were combined to fit Anderson and Barrette's classification as follows:

OBSERVING - monitor

ACTIVE INSTRUCTION - lecture, feedback, hustle, modeling, listen, asking and answering questions

MANAGING STUDENTS AND ENVIRONMENT - giving directions, maintenance, behavior praise, nags and punishment

INSTRUCTION RELATED - officiating, teacher participation and spotting

The instruction related category occurred so infrequently that it will not be reported. This differs
from Anderson and Barrette's study, where it occurred 16.9% of the time. Differences were also evident in the active instruction and managing students and environment categories. The four teachers in this study exhibited active instruction only 20% of the time, ranging from 10 to 27%. Anderson and Barrette report 36.9%. Anderson and Barrette report 20.4% of the managing students and environment category whereas this investigation found 47%, ranging from 39 to 57%. The observing category percentages were more in agreement. This investigation found 18% observing; Anderson and Barrette report 21.2%.

As with ALT-PE categories, the teacher behaviors evidence variability and no discernible change across phases. The teacher behaviors reported are depicted in Figures 25 through 27.
Figure 25: Percent of Intervals of Teacher Observation
Figure 26: Percent of Intervals of Active Instruction
Figure 27: Percent of Intervals of Managing Students and Environment
Summary

In Chapter IV, the scored-interval reliability tables for each of the four observers are presented. The tables include percentages for each category reported in the study and crossed all phases of the study.

Results of the data collection of content-physical education, engaged time, motor responses, ALT-PE and ALT-PE(M) and the teacher behaviors are reported. Concurrent graphs of ALT-PE(M) of the three students in each class are presented.
CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter will begin by providing a summary of the study. Conclusions will then be drawn from the results of the study and recommendations will be made for further investigations involving ALT-PE.

Review of the Study

The primary purpose of this investigation was to determine the effect that daily monitoring and graphic feedback to the in-service teacher and to the students had on Academic Learning Time-Physical Education. Information from the Metzler study and from casual observation of physical education classes indicate that there may be two problems that need to be targeted in order to increase ALT-PE. The first is that teachers need to improve the planning of instruction and the organization and management of classroom events in order to maximize students' opportunity to respond. Second, the environment needs to be created such that students will take advantage of the opportunities to respond that they have been afforded.
It is apparent that different students in the same class may have very different ALT-PE. It may be that their skill levels are different and some are having more success than others. It may also be that some are taking advantage of the opportunities to respond while others are not. It is not unusual to see the shy student standing in the background not wanting to get on the tumbling mat or up on the parallel bars.

Feedback was chosen as the intervention for two reasons. One, it is an unobtrusive method requiring little effort on the part of the teachers and students. And two, feedback has been demonstrated as being effective in creating behavior change in a variety of settings as outlined in Chapter II.

The ALT-PE instrument was used for daily observations. A teacher behavior observation system was added in order to monitor any change in teacher behavior that may have occurred. Observers began observing at the time the teacher indicated class was to begin and ended when class was dismissed.

Observers completed a sequential training program which ended with reliability checks in two live settings. All observers were deemed to be capable of reliable recording of observations. To ensure that reliable observations were maintained throughout the study, each observer's reliability was checked twice in each
phase of the study. Reliability was also checked twice in each school setting during each phase of the study.

Three students were randomly selected from each of four physical education classes. The classes were from three high schools and one middle school in the Columbus, Ohio, area. All teachers were in-service teachers with five or more years of experience in the public schools.

The study consisted of a baseline phase, an intervention with the teacher, and an intervention with the students. Prior to the baseline the classes were informed that the observers would be in the gymnasium for the next 6 to 7 weeks observing the way students spent time in physical education class and would work with the teacher to help bring improvement in the way time was spent. No other special arrangements were made. Baseline was recorded from the beginning of the observational period until feedback to the teacher began in an attempt to improve ALT-PE.

The intervention with the teacher was the next phase of the investigation. The teachers were given definitions and an explanation of all facets of the ALT-PE systems. Graphs were provided daily on content physical education, engaged time, motor response time, ALT-PE, and ALT-PE(M). Teachers were made aware that an increase in each of these was desirable. The motor
response aspect was stressed. The exact nature of how to achieve increases on the aspects of ALT-PE provided them was left to the teachers. Daily feedback to the teachers continued throughout the study.

Intervention with the students constituted the final phase of the study. A bar graph depicting the percent of intervals of motor responses for the class was posted for the class to see each day. The class motor response level was calculated by averaging the motor response level of the three students observed. The class was informed that their goal should be to increase the frequency of the motor responses during each class to a level higher than previous levels. The classes were given definitions and examples of motor responses. The feedback was provided each day from the point of intervention until the completion of the study.

Experimental analysis was conducted via a multiple baseline design across the four school settings. Significance would be demonstrated if the dependent variables in subsequent phases had improved such that there was little or no overlap with previous phases of the study.

The results of the study were depicted graphically in Chapter IV. The data in all graphs are characterized by variability and overlap between phases. The results of the study indicate that the interventions did not
significantly affect ALT-PE nor did teacher behavior change. Changes in ALT-PE occurred with changes in activities.

The data of the three classmates in each school were graphed concurrently. This proved interesting as the three students in the same class followed the same trends in all settings. If some students were taking advantages of the opportunities to respond that are provided by the teachers and others were not, this would not be the case. Students in the same class would have different ALT-PE, and the trends in the data would differ. The trends of the three students in each class are so similar that it becomes apparent the ALT-PE is not simply a motivational problem but is teacher controlled.

Conclusions

Within the limitations and delimitations of this study and as a result of analyzing the data, the following conclusions were drawn:

1. Graphic feedback to the teachers had no effect on content-physical education.

2. With the exception of one setting, graphic feedback to the teachers had no effect on the engaged time of the students.

3. Graphic feedback to teachers and students had no effect on the percent of intervals in which students made motor responses or on their ALT-PE(M).
4. Daily monitoring and graphic feedback to teachers on the students' ALT-PE had no effect on the ALT-PE.

5. Changes in ALT-PE and ALT-PE(M) occurred with changes in activities, rather than with the interventions in settings one and two. Setting three had only one activity and setting four had no noticeable positive change during the study.

6. The ALT-PE(M) data of students in the same class fluctuate in the same direction on the same days. This is an indication that student motivation is not the major problem needed to be targeted in attempts to increase ALT-PE. Students are not independent of teacher control or of the control of their classmates.

7. The content-physical education, engaged time, motor responses, ALT-PE and ALT-PE(M) reported in this study were all higher than that reported in the Metzler study. This may be due to the setting of the activities. These were indoors, whereas Metzler's were outdoors. This would be consistent with a conclusion of McKenzie (1976) that management time is greater when the physical education setting is out of doors.

8. Feedback on aspects of ALT-PE had no effects on teacher behavior.

**Recommendations**

Future attempts to increase ALT-PE should deal with the influence the teacher has over the class, i.e., class management or teacher behaviors. In the rationale for the study, two possible methods for increasing ALT-PE were identified. One was for the teacher to provide more opportunities to respond and the other was for the
student to take better advantage of those opportunities. If the latter was a great problem one might reasonably expect that some students in the same class would take advantages of the opportunities to respond and others would not. Their ALT-PE would be quite different as would the up and down trends of the data. This is not the case. Classmates follow almost exactly the same pattern of ALT-PE(M). It is possible that none of the students observed were taking advantage of the opportunities to respond. It may be that feedback alone is not sufficient to motivate students to respond and that reinforcers are needed for both teachers and students to increase ALT-PE.

However, the trends of classmates so closely resemble each other that it becomes apparent that ALT-PE is teacher controlled. Future interventions should focus on developing management and organization skills of the teacher so that students are provided more opportunities to respond. Interventions might also be effective if teacher behaviors are pinpointed as influencing student responding, then those teacher behaviors are improved in an attempt to increase ALT-PE.

Another suggestion for researchers using ALT-PE is to report data for different activities observed. It is apparent that different physical education settings may produce very different ALT-PE. Judgments about the
effectiveness of teachers on the basis of ALT-PE are now tenuous. It is not known yet what percent ALT-PE is good or average. Good ALT-PE percentage in one activity may not be good in another. It would be productive if all researchers involved with ALT-PE would compile descriptive data of the different activities observed, both before and after interventions. This would give us a yardstick for measuring relative effectiveness of present instruction in that particular activity and what ALT-PE might be reasonably expected of that activity. See Appendix D for activity data from this investigation.

Finally, correlations need to be made between ALT-PE and student achievement as soon as possible. Closed skill activities such as bowling or archery might be the best activities to work with at the present time. The product measure for skill achievement would simply be the scores and the setting is standardized for all participants. Finding positive relationships between ALT-PE and student achievement would close a credibility gap left due to the generalization to physical education from the math and reading findings in the BTES investigations.
APPENDIX A

OBSERVER TRAINING MANUAL
TRAINING MANUAL
FOR THE
ACADEMIC LEARNING TIME-PHYSICAL EDUCATION-TEACHER BEHAVIOR
RECORDING SYSTEM
INTRODUCTION

This is the training manual for the Academic Learning Time-Physical Education-Teacher Behavior (ALT-PE-TB) behavioral recording system. The system is designed for on-site observation of students in physical education classrooms at every grade level. The purpose of the system is to catalog, in several ways, the manner in which students spend their time in physical education classes. The system is also designed to concurrently monitor teacher behavior.

The coding system is based on interval recording techniques whereby student and teacher behavior is observed for short periods of time and then recorded onto the ALT-PE-TB coding sheet.

This manual is intended to take you through the training program of the ALT-PE-TB coding system. As you will see, the system is very simple and relatively easy to learn. The training manual is divided into 9 sequenced tasks leading to actual gathering of data for analysis. Tasks 1 and 2 can be completed on your own and at your own pace. Tasks 3 through 9 must be completed under the supervision of the experimenter and require a series of practice tasks to be done. Once you have completed all tasks you will be prepared to
go into public school classes to make observations for analysis.
Task 1

On the following pages, you will find a list of the 43 behavioral definitions to be used in the ALT-PE-TB recording instrument. Carefully study this list until you can identify each behavior category, its coding symbol, and the corresponding definition.

Once you have learned the definitions, symbols, and behavioral categories, proceed to Task 2.
SETTING: Assign a setting and content code for each interval.

Direct Instruction (D)  Teacher controls instruction, focus, and pacing of instruction (includes attendance checks, announcements, other preliminary classwork, etc.).

Task (T)  Instruction defined by task--multiple station and/or multiple task.

Reciprocal (R)  Students in pairs for instruction and feedback to each other.

Group (G)  Same functions as reciprocal with larger group.

Guided Discovery (GD)  Teacher leads student toward predetermined goal through series of sequenced prompts.

Problem Solving (P)  Teacher controls instruction through sequenced problems in which alternative solutions are possible.

CONTENT-GENERAL

Wait (W)  Period when student has performed the necessary activity (after transition or management) and is waiting for the next. (Waiting in line or for the next turn to practice is coded on the learner move level, not on the content level.)

Transition (T)  Time devoted to class business that is related to instructional activity (includes managerial activities related to instruction, such as equipment change, lining up, selecting teams, etc.).

Management (M)  Time devoted to class business that is unrelated to instructional activity, such as taking attendance.
**Break (B)**  
Intentional periods of no activity to rest students, drink water, etc.

**Non-academic Instruction (N)**  
Activities which fall outside the narrow domain of focused instruction, such as rapport building.

**CONTENT-PE**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skill Practice (P)</td>
<td>Direct participation in drills and other activities in which the primary goal is individual skill development.</td>
</tr>
<tr>
<td>Scrimmage (S)</td>
<td>Controlled group practice in which instruction and feedback are frequent.</td>
</tr>
<tr>
<td>Game (G)</td>
<td>Practice under game conditions.</td>
</tr>
<tr>
<td>Fitness (F)</td>
<td>Repetitive activities for fitness development such as calisthenics, running laps, weight lifting, etc. Also, warm up and cool down activities such as stretching.</td>
</tr>
<tr>
<td>Other Motor Activity (O)</td>
<td>Motor activity unrelated to specific activity of the day's instruction.</td>
</tr>
<tr>
<td>Knowledge Focus (K)</td>
<td>Activities in which teacher is giving verbal instructions or demonstration about skill, fitness, historical information, strategies, rules, etc., as the focus.</td>
</tr>
<tr>
<td>Social Behavior (B)</td>
<td>Activities in which social behavior, attitudes, etc., are the focus.</td>
</tr>
</tbody>
</table>

**LEARNER MOVES:** Assign a learner moves code for every interval in which one of the content-PE codes is assigned.

**Engaged, Motor Response (M)**  
Student is performing a skill including supportive motor involvement such as screening in
basketball, backing up in baseball, moving to block in volleyball.

Engaged, Indirect Participation (K) Student is in an activity but is not directly involved with the immediate action such as right fielder during pitch, basketballer who does not move down court during a fast break, servicing another player by spotting, feeding balls, or other supportive activities unless that is the main focus of the instruction.

Engaged, Cognitive (C) Cognitive involvement related to instruction, such as listening, questioning, verbal responding, or thinking about the activity (as in problem solving).

Not Engaged, Interim (NI) Any non-instructional activity that is a natural part of the practice activity (such as changing equipment, changing sides of a court, retrieving the ball, etc.).

Not Engaged, Waiting (NW) Time during activity when student is waiting for help or waiting to participate again. (Student does not have an opportunity to respond, such as in line or a substitute or waiting for equipment to be repaired, etc.)

Not Engaged, Off Task (NO) Periods when student is inappropriately disengaged from the practice, including socializing, daydreaming, misbehaving, and failing to respond when given the opportunity.

DIFFICULTY LEVEL: Assign a level of difficulty for every interval in which one of the engaged codes are entered on the learner moves level.

Easy (E) Few errors are made and student performs appropriately with little effort, experiencing
success frequently. In game or scrimmage situations the student anticipates properly, moves and responds to situations appropriately and fulfills the roles demanded by the game.

| Medium (M) | Any performance that is other than easy or hard. When in doubt, code the response as medium. |
| Hard (H)   | Many errors are made and student appears to be unable to perform appropriately, experiencing lack of success frequently. Chances of success are not much better than luck. |
ALT-PE DECISION LOG

SETTING

When instructional format is not yet clear, code direct instruction until it becomes clear, and then adjust previous intervals. Circle the D code in the first interval in which the instruction is not yet clear, so as to mark the interval to begin your adjustment.

CONTENT

Code the content level based on what the individual student is supposed to be doing. In most cases, the entire class will be in same content, but there may be times when different groups are in different contents.

LEVEL OF DIFFICULTY

In a drill setting, assess the level of difficulty according to the objectives set forth by the teacher, whether they be directly stated or implied in the instructions.

ALT-PE HIERARCHY DECISIONS

If two or more behaviors are observed in the same interval and are located on different levels, code the behavior listed farther to the right on the coding sheet.

If two behaviors from the same level are observed in the same interval, code the behavior listed higher on the coding sheet.

If the student makes more than one response in the same interval, code the response with the easiest level of difficulty.

ALT-PE CODING CONVENTIONS

If the present interval has any codes identical to those in the immediately preceding interval, place a dash (−) in the appropriate box(es). However, always write the full code in the first interval of each row.

If you miss an interval, leave it blank and get ready for the next observation interval.
If you discover that you are not in sequence with the cuing tape, begin coding again with the next numbered interval from the tape.
TEACHER BEHAVIORS: Assign a teacher behavior for every interval.

Lecturing (LE) Teacher gives facts or opinions about content or procedures. Teacher may lecture to one or many students.

Giving Directions (G) Teacher directs a student or group of students to perform a task. The direction may be verbal or non-verbal.

Listening (L) Teacher listens to a student's question or response. Teacher may be listening to one student or a group of students and must be silent for the full interval.

Asking Questions (AQ) Teacher asks questions about content or procedures with the intent of obtaining a response. Rhetorical questions should not be coded in this category. Questions may be individual or group oriented.

Answering Questions (Q) Teacher answers a student or group of students' questions.

Nonfunctional (NF) Teacher is engaged in behavior unrelated to the content or procedures of the practice. Talking to a visitor or an observer are prime examples.

Monitoring (M) Teacher observes the practice without reacting verbally to the behaviors of individuals in the practice. The teacher's eyes must be directed toward at least one individual in the practice to code in this category. Watching a practice game is an example.

Maintenance (MI) Teacher is engaged in activities that are indirectly related to the practice objectives. These include such behaviors as checking attendance, putting
away or handing out equipment, or administering first aid.

**Hustles (H)**
Teacher uses verbal statements or gestures to activate or intensify the motor performance of the student(s). Examples include such statements as, "Run, run, run," "Move," "Go, go." Encouraging clapping of the hands would be considered a hustle. The tone of the voice and general level of enthusiasm are extremely important in this category. Do not mistake these statements and gestures as negative or corrective skill feedback statements.

**Modeling (MO)**
Teacher demonstrates a skill behavior for one or many students. If verbal instruction accompanies a modeling behavior, prioritize the modeling for coding purposes. Showing a student how to perform a skill properly would be a modeling behavior.

**Officiating (O)**
Teacher is actively refereeing a sport or game. Verbal behavior which entails rules, regulations, or judgments about the sport or game should be coded officiating.

**Behavior Praise (B)**
Teacher provides positive or supportive statements or gestures to a behavior episode unrelated to motor skill performance. Examples include, "Tremendous, class, you lined up beautifully" or "I like the way you are sitting without talking, Judy."

**Nags (N)**
Teacher verbally or nonverbally scolds a student or group of students for undesirable behavior or skill attempts in a low intensity manner. Nags also include pleas to the class that
they return to on-task behavior that go unheeded by the students. Examples of nags are, "I told you to get in line," "Listen up, listen up," "Quit it," "Didn't I say to stop chattering."

**Punishment (P)**

Specific penalties imposed by teacher to a student or group of students who exhibit disruptive or deviant behaviors. Examples include assigning a student to "time-out," doing "laps," having the student apologize to another student or the teacher.

**Teacher Participation (TP)**

Teacher actively participates in a game or sport with the students. Any verbal behavior on the part of the teacher would take priority over this behavior.

**Feedback (F)**

Teacher praises a student's skill performance or provides verbal information about how a student may improve or adjust a motor skill performance for subsequent attempts. Examples include, "Great," "Fine job, you followed through well," "Next time bend your knees a bit more," and gestures such as thumbs up.

**Spotting (S)**

Teacher assists a student in the performance of a motor task with the intent of providing safe conditions for that student. If the teacher engages in verbal behavior while spotting, the verbal behavior should receive priority for coding purposes.
Task 2

In the column on the left you will find ALT-PE-TB behavioral definitions just as they appear on the list you have studied. Read each definition and write the corresponding behavior category and coding symbol in the space provided in the column on the right.

The criterion level of acceptance for this task is 27 of 30 items correct.

<table>
<thead>
<tr>
<th>DEFINITION</th>
<th>CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Instruction defined by task--multiple station and/or multiple task (setting level)</td>
<td>1.</td>
</tr>
<tr>
<td>2. Direct participation in drills and other activities in which the primary goal is individual skill development (content level)</td>
<td>2.</td>
</tr>
<tr>
<td>3. Student is performing a skill including supportive motor involvement such as screening in basketball, backing up in baseball, moving to block in volleyball (learner moves level)</td>
<td>3.</td>
</tr>
<tr>
<td>4. Many errors are made and student appears to be unable to perform appropriately, experiencing lack of success frequently. Chances of success are not much better than luck. (difficulty level)</td>
<td>4.</td>
</tr>
<tr>
<td>5. Teacher answers a student or group of students' questions (teacher behavior)</td>
<td>5.</td>
</tr>
<tr>
<td>6. Students in pairs for instruction and feedback to each other (setting level)</td>
<td>6.</td>
</tr>
<tr>
<td><strong>DEFINITION</strong></td>
<td><strong>CATEGORY</strong></td>
</tr>
<tr>
<td>--------------------------------------</td>
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<tr>
<td>7. Teacher observes the practice</td>
<td>7. _________</td>
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<tr>
<td>without reacting verbally to the</td>
<td></td>
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<tr>
<td>behaviors of individuals in the</td>
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<tr>
<td>practice. The teacher's eyes must</td>
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<td>be directed toward at least one</td>
<td></td>
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<tr>
<td>individual in the practice to code</td>
<td></td>
</tr>
<tr>
<td>in this category. Watching a practice</td>
<td></td>
</tr>
<tr>
<td>game is an example. (teacher behavior)</td>
<td></td>
</tr>
<tr>
<td>8. Time devoted to class business</td>
<td>8. _________</td>
</tr>
<tr>
<td>that is unrelated to instructional</td>
<td></td>
</tr>
<tr>
<td>activity, such as taking attendance.</td>
<td></td>
</tr>
<tr>
<td>(content level)</td>
<td></td>
</tr>
<tr>
<td>9. Repetitive activities for fitness</td>
<td>9. _________</td>
</tr>
<tr>
<td>development such as calisthenics,</td>
<td></td>
</tr>
<tr>
<td>running laps, weight lifting, etc.</td>
<td></td>
</tr>
<tr>
<td>Also, warm up and cool down</td>
<td></td>
</tr>
<tr>
<td>activities such as stretching</td>
<td></td>
</tr>
<tr>
<td>(content level)</td>
<td></td>
</tr>
<tr>
<td>10. Activities in which teacher is</td>
<td>10. _________</td>
</tr>
<tr>
<td>giving verbal instructions or</td>
<td></td>
</tr>
<tr>
<td>demonstration about skill, fitness,</td>
<td></td>
</tr>
<tr>
<td>historical information, strategies,</td>
<td></td>
</tr>
<tr>
<td>rules, etc., as the focus (content</td>
<td></td>
</tr>
<tr>
<td>level)</td>
<td></td>
</tr>
<tr>
<td>11. Teacher is engaged in activities</td>
<td>11. _________</td>
</tr>
<tr>
<td>that are indirectly related to the</td>
<td></td>
</tr>
<tr>
<td>practice objectives. These</td>
<td></td>
</tr>
<tr>
<td>include such behaviors as checking</td>
<td></td>
</tr>
<tr>
<td>attendance, putting away or</td>
<td></td>
</tr>
<tr>
<td>handing out equipment, or administering first aid. (teacher behavior)</td>
<td></td>
</tr>
<tr>
<td>12. Teacher is actively refereeing</td>
<td>12. _________</td>
</tr>
<tr>
<td>a sport or game. Verbal behavior</td>
<td></td>
</tr>
<tr>
<td>which entails rules, regulations or</td>
<td></td>
</tr>
<tr>
<td>judgments about the sport or game</td>
<td></td>
</tr>
<tr>
<td>should be coded ____. (Teacher</td>
<td></td>
</tr>
<tr>
<td>behavior)</td>
<td></td>
</tr>
<tr>
<td>13. Practice under game conditions.</td>
<td>13. _________</td>
</tr>
<tr>
<td>(content level)</td>
<td></td>
</tr>
<tr>
<td>DEFINITION</td>
<td>CATEGORY</td>
</tr>
<tr>
<td>------------</td>
<td>----------</td>
</tr>
<tr>
<td>14. Teacher praises a student's skill performance or provides verbal information about how a student may improve or adjust a motor skill performance for subsequent attempts. Examples include, &quot;Great,&quot; &quot;Fine job, you followed through well,&quot; &quot;Next time bend your knees a bit more,&quot; and gestures such as thumbs up. (Teacher behavior)</td>
<td>14.</td>
</tr>
<tr>
<td>15. Teacher assists a student in the performance of a motor task with the intent of providing safe conditions for that student. If the teacher engages in verbal behavior while ____, the verbal behavior should receive priority for coding purposes (teacher behavior)</td>
<td>15.</td>
</tr>
<tr>
<td>16. Any non-instructional activity that is a natural part of the practice activity (such as changing equipment, changing sides of a court, retrieving the ball, etc.) (Learner moves level)</td>
<td>16.</td>
</tr>
<tr>
<td>17. Few errors are made and student performs appropriately with little effort, experiencing success frequently. In game or scrimmage situations, the student anticipates properly, moves and responds to situations appropriately and fulfills the roles demanded by the game. (difficulty level)</td>
<td>17.</td>
</tr>
<tr>
<td>18. Period when student has performed the necessary activity (after transition or management) and is waiting for the next. (Waiting in line or for the next turn to practice is</td>
<td>18.</td>
</tr>
</tbody>
</table>
DEFINITIONS

coded on the learner move level, not on the content level.\( ) \) (content level)

19. Teacher controls instruction, focus, and pacing or instruction (includes attendance checks, announcements, other preliminary classwork, etc.) (setting level)

20. Cognitive involvement related to instruction, such as listening, questioning, verbal responding, or thinking about the activity (as in problem solving) (learner moves level)

21. Teacher is engaged in behavior unrelated to the content or procedures of the practice. Talking to a visitor or an observer are prime examples. (teacher behavior)

22. Teacher directs a student or group of students to perform a task. The direction may be verbal or non-verbal. (teacher behavior)

23. Time during activity when student is waiting for help or waiting to participate again. (Student does not have an opportunity to respond, such as in line or a substitute or waiting for equipment to be repaired, etc.) (Learner moves level)

24. Teacher demonstrates a skill behavior for one or many students. If verbal instruction accompanies a modeling behavior, prioritize the modeling for coding purposes. Showing a student how to perform a skill properly would be a modeling behavior. (Teacher behavior)
<table>
<thead>
<tr>
<th>DEFINITIONS</th>
<th>CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>25. Controlled group practice in which instruction and feedback are frequent. (content level)</td>
<td>25.</td>
</tr>
<tr>
<td>26. Teacher gives facts or opinions about content or procedures. Teacher may lecture to one or many students. (teacher behavior)</td>
<td>26.</td>
</tr>
<tr>
<td>27. Time devoted to class business that is related to instructional activity (includes managerial activities related to instruction, such as equipment change, lining up, selecting teams, etc.). (content level)</td>
<td>27.</td>
</tr>
<tr>
<td>28. Student is in an activity but is not directly involved with the immediate action such as right fielder during pitch, basketballer who does not move down court during a fast break, servicing another player by spotting, feeding balls, or other supportive activities unless that is the main focus of the instruction. (learner moves level)</td>
<td>28.</td>
</tr>
<tr>
<td>29. Periods when student is inappropriately disengaged from the practice, including socializing daydreaming, misbehaving and failing to respond when given the opportunity. (Learner move)</td>
<td>29.</td>
</tr>
<tr>
<td>30. Specific penalties imposed by teacher to a student or group of students who exhibit disruptive or deviant behaviors. Examples include assigning a student to &quot;time-out,&quot; doing laps, having the student apologize to another student or the teacher. (teacher behavior)</td>
<td>30.</td>
</tr>
</tbody>
</table>
Task 3

Once you have an understanding of each behavior category, complete the written test below. The column on the left will describe teacher and/or students behavior. On the line in the column on the right, enter the coding symbol for the behavior listed on the left. The criterion is 45 of 50 correct items.

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>(setting level)</td>
<td></td>
</tr>
<tr>
<td>1. Teacher is taking role</td>
<td>1.</td>
</tr>
<tr>
<td>2. Class is broken into three groups, each going to a different station for practice.</td>
<td>2.</td>
</tr>
<tr>
<td>3. Students are working in pairs, giving help to each other</td>
<td>3.</td>
</tr>
<tr>
<td>4. Students are doing push-ups to teacher's commands</td>
<td>4.</td>
</tr>
<tr>
<td>5. Teacher has presented the students with a task to accomplish and students have started to work on the assignment on their own.</td>
<td>5.</td>
</tr>
<tr>
<td>(content level)</td>
<td></td>
</tr>
<tr>
<td>6. Students listen while teacher takes role</td>
<td>6.</td>
</tr>
<tr>
<td>7. Teacher is explaining how to do a lay-up prior to practice of the skill</td>
<td>7.</td>
</tr>
<tr>
<td>8. Student is walking to next station</td>
<td>8.</td>
</tr>
<tr>
<td>9. Students are doing a bump drill in a volleyball class</td>
<td>9.</td>
</tr>
<tr>
<td>DESCRIPTION</td>
<td>CATEGORY</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>10. Teacher lets student go get a drink of water</td>
<td>10. _____</td>
</tr>
<tr>
<td>11. Students are playing a half-court basketball game with the teacher stopping them after each play for feedback</td>
<td>11. _____</td>
</tr>
<tr>
<td>12. Students are playing &quot;new games&quot;</td>
<td>12. _____</td>
</tr>
<tr>
<td>13. Students are stretching before class begins</td>
<td>13. _____</td>
</tr>
<tr>
<td>14. Teacher is giving directions for changing stations</td>
<td>14. _____</td>
</tr>
<tr>
<td>15. Students are in an activity designed to get each other acquainted</td>
<td>15. _____</td>
</tr>
<tr>
<td>16. The teacher goes to the other end of the gym and students are waiting for the next directions (learner moves level)</td>
<td>16. _____</td>
</tr>
<tr>
<td>17. Teams are changing fields in a softball game</td>
<td>17. _____</td>
</tr>
<tr>
<td>18. Student makes a bump pass in a drill</td>
<td>18. _____</td>
</tr>
<tr>
<td>19. Student is waiting for next turn in the same drill from number 18</td>
<td>19. _____</td>
</tr>
<tr>
<td>20. Student is fooling with the person at the next station</td>
<td>20. _____</td>
</tr>
<tr>
<td>21. Students are listening to teacher explain how to do a forward roll</td>
<td>21. _____</td>
</tr>
<tr>
<td>22. Student is a substitute in a soccer game</td>
<td>22. _____</td>
</tr>
<tr>
<td>23. Student is standing in the back line in a volleyball game and the three touches are taken by front line players only</td>
<td>23. _____</td>
</tr>
<tr>
<td>DESCRIPTION</td>
<td>CATEGORY</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>24. Student moves to get in position for a rebound</td>
<td></td>
</tr>
<tr>
<td>25. In a tennis hitting drill, the target student is throwing practice balls to another student</td>
<td></td>
</tr>
<tr>
<td>(difficulty level)</td>
<td></td>
</tr>
<tr>
<td>26. In a volleyball game, the target student makes a good bump which is easily fielded by the setter</td>
<td></td>
</tr>
<tr>
<td>27. Student travels with the ball in a basketball game</td>
<td></td>
</tr>
<tr>
<td>28. Student completes a new beam routine with two falls</td>
<td></td>
</tr>
<tr>
<td>29. Student is in bad defensive position away from the ball</td>
<td></td>
</tr>
<tr>
<td>30. Student does 10 push-ups in one minute, and the teacher wanted everyone to do 15 in the same time span</td>
<td></td>
</tr>
<tr>
<td>(teacher behavior)</td>
<td></td>
</tr>
<tr>
<td>31. Teacher says, &quot;Good job, John, way to follow through.&quot;</td>
<td></td>
</tr>
<tr>
<td>32. Students are playing games while the teacher is off to the side watching the action</td>
<td></td>
</tr>
<tr>
<td>33. The teacher is taking the role</td>
<td></td>
</tr>
<tr>
<td>34. The teacher demonstrates the skill while explaining the important points at the same time</td>
<td></td>
</tr>
<tr>
<td>35. The teacher asks, &quot;What are the two major points to think about when performing a lunge?&quot;</td>
<td></td>
</tr>
<tr>
<td>36. The teacher is standing and explaining the safety points in gymnastics</td>
<td></td>
</tr>
<tr>
<td>DESCRIPTION</td>
<td>CATEGORY</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>37. The principal has entered the gym and the teacher is talking to him/her</td>
<td>37.</td>
</tr>
<tr>
<td>38. The teacher sends a student to the office for continued disruptive behavior</td>
<td>38.</td>
</tr>
<tr>
<td>39. The teacher is calling carries and calling out the score in a volleyball game</td>
<td>39.</td>
</tr>
<tr>
<td>40. The teacher says, &quot;I like your new shoes, Jim, and I'm glad you brought them so you can play today.&quot;</td>
<td>40.</td>
</tr>
<tr>
<td>41. The teacher is physically guiding a student through a back flip.</td>
<td>41.</td>
</tr>
<tr>
<td>42. The teacher is doing exercises with the class even though there is a student leader.</td>
<td>42.</td>
</tr>
<tr>
<td>43. Teacher says, &quot;Quiet, I told you to stay quiet while I am talking.&quot;</td>
<td>43.</td>
</tr>
<tr>
<td>44. The teacher is quiet and attentive while the student is asking a question.</td>
<td>44.</td>
</tr>
<tr>
<td>45. The teacher now provides the student with an answer.</td>
<td>45.</td>
</tr>
<tr>
<td>46. The teacher yells to the defense, &quot;Move, move, stay with them, stay with them!&quot;</td>
<td>46.</td>
</tr>
<tr>
<td>47. The teacher tells group A to go to the tramp and group B to go to the mats.</td>
<td>47.</td>
</tr>
<tr>
<td>48. The teacher says, &quot;Can't you people ever do what you are asked to?&quot;</td>
<td>48.</td>
</tr>
<tr>
<td>49. The teacher says, &quot;Bend your knees a little more, John.&quot;</td>
<td>49.</td>
</tr>
<tr>
<td>DESCRIPTION</td>
<td>CATEGORY</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>50. The teacher claps his/her hands and yells for the students to pick up the tempo.</td>
<td>50.</td>
</tr>
<tr>
<td>Setting:</td>
<td>Content-Gen:</td>
</tr>
<tr>
<td>----------</td>
<td>--------------</td>
</tr>
<tr>
<td>Dir. Instr. (D)</td>
<td>HW (I)</td>
</tr>
<tr>
<td>Task (T)</td>
<td>Transition (I)</td>
</tr>
<tr>
<td>Back (B)</td>
<td>Management (I)</td>
</tr>
<tr>
<td>Group (G)</td>
<td>Break (I)</td>
</tr>
<tr>
<td>Cold. Dis. (CD)</td>
<td>Training (I)</td>
</tr>
<tr>
<td>Prob. Sol. (P)</td>
<td>Instructing (I)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Skills:</th>
<th>Social Behavior (S)</th>
<th>Knowledge (K)</th>
<th>Non-Functional (N)</th>
</tr>
</thead>
</table>
| Scaring (S) | Distraction (D) | Monitoring (M) | }

<table>
<thead>
<tr>
<th>Time:</th>
<th>Position:</th>
</tr>
</thead>
<tbody>
<tr>
<td>123456789101112131415161718192021222324252627282930313233343536</td>
<td></td>
</tr>
</tbody>
</table>

| Reliability Observer: | Observer: | Date: | School and Grade: | Teacher: |
Task 4

Review the ALT-PE-TB interval recording instrument coding sheet that has been provided. There will be opportunities to have questions answered concerning the coding conventions and the use of the coding sheet.

With the experimentor present for immediate feedback and to answer any questions, you will view a pre-selected video tape and verbally code the tape each time the experimentor stops it. Whenever a wrong answer is given, the tape will remain stopped, and the experimentor will clarify the reasoning for the correct code.

Task 5

A pre-selected video tape will be shown and coded for 8 minutes (40 intervals). The experimentor shall code the video tape concurrently.

For the first two minutes (10 intervals), observe one student and code only the setting level.

In the next two minutes, observe one student and code the setting and content levels.

In the third two minutes, code one student in the setting, content, and learner moves levels.

For the final two minutes, code the first four levels of the ALT-PE-TB system while observing one student.

Ninety percent reliability with the experimentor must be obtained on each level.
Task 6

A pre-selected video tape will be shown and coded for 8 minutes. The experimenter shall code the video tape concurrently.

Code the teacher behavior for the entire time. Ninety percent reliability with the experimenter must be obtained.

Task 7

You will be shown 20 examples of student and teacher behavior on a video tape. After each example the tape will be stopped for 10 seconds, during which time you will enter the code onto an ALT-PE-TB coding sheet. The tape will not be stopped for any other purpose than to code behavior.

The criterion level of acceptance for this task is 18 of 20 examples coded correctly.

Task 8

Two pre-selected video tapes shall be coded along with the experimenter. These tapes shall be of 20 minutes duration. Eighty percent reliability must be obtained on all levels for two consecutive video tapes.
Task 9

Each observer shall arrange with the experimentor to observe and code two physical education classes. Three randomly selected students shall be chosen to be observed during these classes. The observations shall be for the entire class. Eighty percent agreement with the experimentor must be obtained on all levels for two consecutive observation periods.
ACKNOWLEDGMENT

This training manual has been adapted and revised from Metzler's (1979) *Measurement of Academic Learning Time-Physical Education* with the permission of the author.
OBSERVATION CHECKLIST

1. Check the observation schedule given to you and note the time, teacher, and location of the school.

2. Plan your travel time to get you to the school 10 minutes before the scheduled start of class.

3. Make sure you have: 1. tape player with batteries 2. cuing tape and back up 3. ear jack 4. coding sheets 5. pencils

4. Check the name of the teacher from the list of schools and teachers provided. Write the teacher and school code on the coding sheets.

5. Check the names and identification codes of the students to be observed. Ask the teacher to discretely point out the students--be very sure you know who they are before the class begins.

6. Ask the teacher to examine his/her allocated time log and enter the allocated time onto the coding sheet for that class.

7. Observe and code the class.

8. Make sure the coding sheet is filled out completely for start, stop, intervals, etc.

9. Return the coding sheet to Gary Whaley's mail box in Larkins Hall 344 in the envelopes provided by 12:00 noon the same day the observation was conducted.
APPENDIX B

INFORMED CONSENT FORM
I consent to participating in (or my child's participation in) a study entitled《The Effect of Daily Monitoring and Feedback to Teachers and Students on Academic Learning Time - Physical Education》

Gary Wmley (Investigator/Project Director or his/her authorized representative) has explained the purpose of the study and procedures to be followed. Possible benefits of the study have been described as have alternative procedures, if such procedures are applicable and available.

I acknowledge that I have had the opportunity to obtain additional information regarding the study and that any questions I have raised have been answered to my full satisfaction. Further, I understand that I am (my child is) free to withdraw consent at any time and to discontinue participation in the study without prejudice to me (my child). The information obtained from me (my child) will remain confidential and anonymous unless I specifically agree otherwise.

Finally, I acknowledge that I have read and fully understand the consent form. I have signed it freely and voluntarily and understand a copy is available upon request.

Date: __________________________ Signed: __________________________ (Participant)

(Person Authorized to Consent for Participant - If Required)
APPENDIX C

RANGES AND MEANS FOR EACH ACTIVITY
**TABLE 6**

RANGES AND MEANS FOR ACTIVITIES
(IN PERCENTAGES)

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>BADMINTON</th>
<th>BASKETBALL</th>
<th>DANCE</th>
<th>GYMNASTICS</th>
<th>VOLLEYBALL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Range</td>
<td>Mean</td>
<td>Range</td>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td>Content-Physical Education</td>
<td>67-98</td>
<td>90.2</td>
<td>66-98</td>
<td>82.7</td>
<td>83-96</td>
</tr>
<tr>
<td>Engaged Time</td>
<td>21-96</td>
<td>57.8</td>
<td>19-85</td>
<td>48.7</td>
<td>9-90</td>
</tr>
<tr>
<td>Motor Responses</td>
<td>11-73</td>
<td>36.6</td>
<td>0-68</td>
<td>25.5</td>
<td>9-82</td>
</tr>
<tr>
<td>ALT-PE</td>
<td>11-86</td>
<td>47.6</td>
<td>2-75</td>
<td>38.3</td>
<td>3-90</td>
</tr>
<tr>
<td>ALT-PE(M)</td>
<td>5-51</td>
<td>24.5</td>
<td>0-62</td>
<td>19.1</td>
<td>3-82</td>
</tr>
</tbody>
</table>
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