All too often, students in physical education classes are only accountable for tasks such as attendance, dressing out, and maintaining positive behavior. To shift the focus to content accountability, teachers need to utilize methods and techniques that hold students accountable for subject matter performance.

Another area of concern for physical education teachers has been the development of accurate and easy to use assessment techniques. Unfortunately, most of the formal assessment is determined by the previously mentioned events of compliance. There is currently little formal assessment in physical education that focuses on student performance in the subject matter. Furthermore, for assessment to be authentic, it must be performed in an on-going fashion within the setting where skills were intended to be performed. Thus, this project utilized an on-going, in-class assessment technique as a means of not only holding students accountable for their performance, but also as a means for the involved teachers to improve their use of formal assessment.
Results of this study may have important implications for helping teachers develop skills to teach directly towards standards and benchmarks such as those developed by the National Association for Sport and Physical Education (NASPE, 1995). The benefits of this research consisted of increased knowledge regarding effective methods of holding students accountable for their in-class performance in physical education.

This study examined student performance, measured by the percentage of appropriate practice attempts of physical skills and student fitness engagement, measured by students’ moderate to vigorous physical activity (MVPA) levels during their physical education classes. Appropriate practice attempts have been chosen as the first variable of measure because of their strong correlation with student learning. Physical activity engagement was chosen as the second variable due to its relationship to health related benefits.

It was hypothesized that there is a functional relationship between the teachers’ use of an on-going, in-class performance assessment teaching technique and students engaging in a higher percentage of appropriate practice trials and moderate to vigorous physical activity (MVPA).

Results of this study show mixed results in regards to using on-going, in-class assessment as a method of accountability for both skill engagement and engagement in MVPA. It was demonstrated that teachers using this type of assessment technique are capable of performing accurate assessments of student performance during instruction.
The Use of On-Going, In-Class Assessment as a Method of Accountability during Physical Education

by

Michael Thomas Wright

A DISSERTATION

submitted to

Oregon State University

in partial fulfillment of
the requirements for the degree of

Doctor of Philosophy

Presented July 12, 2000
Commencement June 2001

APPROVED:

Redacted for Privacy
Major Professor, representing Health and Human Performance

Redacted for Privacy
Chair of Department of Exercise and Sport Science

Redacted for Privacy
Dean of Graduate School

I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

Redacted for Privacy
Michael Thomas Wright, Author
I would like to recognize and thank the faculty and staff of the College of Health and Human Performance, the faculty and staff of the Department of Exercise and Sport Science, Dr. Hans van der Mars, Dr. Barbara Cusimano, my committee members, the faculty, staff and students of the area public schools, fellow graduate students, my wife Summer, my parents Sam and Connie, my other parents John and Alene and the rest of my family for all of their support and assistance with the successful completion of this project.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>METHODS</td>
<td>7</td>
</tr>
<tr>
<td>Participants &amp; Setting</td>
<td>7</td>
</tr>
<tr>
<td>Students</td>
<td>7</td>
</tr>
<tr>
<td>Teachers</td>
<td>7</td>
</tr>
<tr>
<td>Program Content &amp; Setting</td>
<td>8</td>
</tr>
<tr>
<td>Target Behaviors</td>
<td>9</td>
</tr>
<tr>
<td>Intervention</td>
<td>10</td>
</tr>
<tr>
<td>Research Design</td>
<td>12</td>
</tr>
<tr>
<td>Fidelity of Treatment</td>
<td>13</td>
</tr>
<tr>
<td>Managing Potential Confounding Variables</td>
<td>14</td>
</tr>
<tr>
<td>Procedures</td>
<td>15</td>
</tr>
<tr>
<td>Data Collection</td>
<td>16</td>
</tr>
<tr>
<td>Observer Training &amp; Reliability</td>
<td>19</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>19</td>
</tr>
<tr>
<td>RESULTS</td>
<td>21</td>
</tr>
<tr>
<td>Interobserver Agreements</td>
<td>21</td>
</tr>
<tr>
<td>Fidelity of Treatment</td>
<td>23</td>
</tr>
<tr>
<td>Managing Potential Confounding Variables</td>
<td>29</td>
</tr>
</tbody>
</table>
## TABLE OF CONTENTS (Continued)

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engagement in MVPA</td>
<td>38</td>
</tr>
<tr>
<td>Engagement in Appropriate Skill Trials</td>
<td>44</td>
</tr>
<tr>
<td>Teacher Questionnaires</td>
<td>45</td>
</tr>
<tr>
<td>DISCUSSION</td>
<td>51</td>
</tr>
<tr>
<td>Fidelity of Treatment</td>
<td>51</td>
</tr>
<tr>
<td>Managing Potential Confounding Variables</td>
<td>52</td>
</tr>
<tr>
<td>On-going, In-class Assessment as a Method of Accountability</td>
<td>54</td>
</tr>
<tr>
<td>Conclusions</td>
<td>57</td>
</tr>
<tr>
<td>Implications</td>
<td>58</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>59</td>
</tr>
<tr>
<td>APPENDICES</td>
<td>68</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mr. Green/Woodland &quot;3&lt;sup&gt;rd&lt;/sup&gt;&quot; MVPA assessment comparison</td>
<td>25</td>
</tr>
<tr>
<td>2.</td>
<td>Mr. Green/Woodland &quot;4&lt;sup&gt;th&lt;/sup&gt;&quot; MVPA assessment comparison</td>
<td>25</td>
</tr>
<tr>
<td>3.</td>
<td>Mr. Green/Woodland &quot;3&lt;sup&gt;rd&lt;/sup&gt;&quot; skill assessment comparison</td>
<td>26</td>
</tr>
<tr>
<td>4.</td>
<td>Mr. Green/Woodland &quot;4&lt;sup&gt;th&lt;/sup&gt;&quot; skill assessment comparison</td>
<td>26</td>
</tr>
<tr>
<td>5.</td>
<td>Mr. Red/Hilltop &quot;7&lt;sup&gt;th&lt;/sup&gt;&quot; MVPA assessment comparison</td>
<td>27</td>
</tr>
<tr>
<td>6.</td>
<td>Mr. Red/Hilltop &quot;8&lt;sup&gt;th&lt;/sup&gt;&quot; MVPA assessment comparison</td>
<td>27</td>
</tr>
<tr>
<td>7.</td>
<td>Mr. Red/Hilltop &quot;7&lt;sup&gt;th&lt;/sup&gt;&quot; skill assessment comparison</td>
<td>28</td>
</tr>
<tr>
<td>8.</td>
<td>Mr. Red/Hilltop &quot;8&lt;sup&gt;th&lt;/sup&gt;&quot; skill assessment comparison</td>
<td>28</td>
</tr>
<tr>
<td>9.</td>
<td>Mr. Green/Woodland &quot;3&lt;sup&gt;rd&lt;/sup&gt;&quot; MVPA teaching behaviors</td>
<td>32</td>
</tr>
<tr>
<td>10.</td>
<td>Mr. Green/Woodland &quot;4&lt;sup&gt;th&lt;/sup&gt;&quot; MVPA teaching behaviors</td>
<td>32</td>
</tr>
<tr>
<td>11.</td>
<td>Mr. Green/Woodland &quot;3&lt;sup&gt;rd&lt;/sup&gt;&quot; skill teaching behaviors</td>
<td>33</td>
</tr>
<tr>
<td>12.</td>
<td>Mr. Green/Woodland &quot;4&lt;sup&gt;th&lt;/sup&gt;&quot; skill teaching behaviors</td>
<td>33</td>
</tr>
<tr>
<td>13.</td>
<td>Mr. Red/Hilltop &quot;7&lt;sup&gt;th&lt;/sup&gt;&quot; MVPA teaching behaviors</td>
<td>34</td>
</tr>
<tr>
<td>14.</td>
<td>Mr. Red/Hilltop &quot;8&lt;sup&gt;th&lt;/sup&gt;&quot; MVPA teaching behaviors</td>
<td>34</td>
</tr>
<tr>
<td>15.</td>
<td>Mr. Red/Hilltop &quot;7&lt;sup&gt;th&lt;/sup&gt;&quot; skill teaching behaviors</td>
<td>35</td>
</tr>
<tr>
<td>16.</td>
<td>Mr. Red/Hilltop &quot;8&lt;sup&gt;th&lt;/sup&gt;&quot; skill teaching behaviors</td>
<td>35</td>
</tr>
<tr>
<td>17.</td>
<td>Mr. Green/Woodland &quot;3&lt;sup&gt;rd&lt;/sup&gt;&quot; teacher movement</td>
<td>36</td>
</tr>
<tr>
<td>18.</td>
<td>Mr. Green/Woodland &quot;4&lt;sup&gt;th&lt;/sup&gt;&quot; teacher movement</td>
<td>36</td>
</tr>
<tr>
<td>19.</td>
<td>Mr. Red/Hilltop &quot;7&lt;sup&gt;th&lt;/sup&gt;&quot; teacher movement</td>
<td>37</td>
</tr>
<tr>
<td>20.</td>
<td>Mr. Red/Hilltop &quot;8&lt;sup&gt;th&lt;/sup&gt;&quot; teacher movement</td>
<td>37</td>
</tr>
<tr>
<td>Figure</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>21.</td>
<td>Woodland School “3rd” MVPA data (low, med., &amp; high Students)</td>
<td>40</td>
</tr>
<tr>
<td>22.</td>
<td>Woodland School “4th” MVPA data (low, med., &amp; high students)</td>
<td>41</td>
</tr>
<tr>
<td>23.</td>
<td>Hilltop School “7th” MVPA data (low, med., &amp; high students)</td>
<td>42</td>
</tr>
<tr>
<td>24.</td>
<td>Hilltop School “8th” MVPA data (low, med., &amp; high students)</td>
<td>43</td>
</tr>
<tr>
<td>25.</td>
<td>Woodland School “3rd” skill data (low, med., &amp; high students)</td>
<td>47</td>
</tr>
<tr>
<td>26.</td>
<td>Woodland School “4th” skill data (low, med., &amp; high students)</td>
<td>48</td>
</tr>
<tr>
<td>27.</td>
<td>Hilltop School “7th” skill data (low, med., &amp; high students)</td>
<td>49</td>
</tr>
<tr>
<td>28.</td>
<td>Hilltop School “8th” skill data (low, med., &amp; high students)</td>
<td>50</td>
</tr>
</tbody>
</table>
LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Interobserver agreement percentages &amp; mean values for MVPA &amp; skill engagement</td>
<td>22</td>
</tr>
<tr>
<td>2. Spearman Rho Correlation of teacher assessment &amp; research data</td>
<td>24</td>
</tr>
</tbody>
</table>
## LIST OF APPENDICES

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Consent Forms</td>
<td>69</td>
</tr>
<tr>
<td>Teacher Consent Form</td>
<td>70</td>
</tr>
<tr>
<td>Parent &amp; Student Consent Form</td>
<td>72</td>
</tr>
<tr>
<td>Institutional Review Board Approval</td>
<td>74</td>
</tr>
<tr>
<td>B. Teacher assessment tools</td>
<td>75</td>
</tr>
<tr>
<td>MVPA Assessment Form</td>
<td>76</td>
</tr>
<tr>
<td>Skill Assessment Form</td>
<td>77</td>
</tr>
<tr>
<td>C. Data collection sheets</td>
<td>78</td>
</tr>
<tr>
<td>Modified SOFIT MVPA Engagement Form</td>
<td>79</td>
</tr>
<tr>
<td>Student Skill Engagement Form</td>
<td>80</td>
</tr>
<tr>
<td>SOFIT Teacher Behavior Observation Form</td>
<td>81</td>
</tr>
<tr>
<td>D. Teacher Interviews</td>
<td>82</td>
</tr>
<tr>
<td>Mr. Green Interview</td>
<td>83</td>
</tr>
<tr>
<td>Mr. Red Interview</td>
<td>85</td>
</tr>
<tr>
<td>E. Review of Literature</td>
<td>88</td>
</tr>
</tbody>
</table>
DEDICATION

This project is dedicated to my wife Summer.
Thank you and I love you.
The Use of On-going, In-class Assessment as a Method of Accountability during Physical Education

Introduction

With the advent and promotion of authentic assessment from the National Association for Sport and Physical Education's (NASPE, 1995) standards and benchmarks, and the Surgeon General's report advocating physical activity (United States Department of Health and Human Services, 1996), there is a need to develop strategies that hold students accountable for learning and participation during physical education. All too often, students in physical education classes are only accountable for tasks such as attendance, dressing out, and maintaining positive behavior. According to Doyle (1977; 1986), educational tasks, and the accountability with which they are presented, represent the functional framework of any student-teacher interaction and therefore is what actually gets accomplished. For instance, if a teacher assigns a group of students a task to complete, such as kicking a soccer ball with the inside of their foot, it is likely that the students will only use the inside of their foot if there is a strong accountability mechanism in place. This behavior is best described for physical education by Siedentop and Tannehill (2000) who state that the student/teacher interaction is a dual directional negotiation of presented tasks.

Siedentop and Tannehill (2000) identified three distinct systems in which tasks are presented. These systems are managerial, instructional, and student-
social. Within each system, tasks are presented by the teacher and then negotiated by students. The original stated tasks become actual tasks through a simple cycle of stated task, student response, teacher supervision, and teacher response.

According to Siedentop and Tannehill (2000), four factors influence the student response to a stated task. These factors include (1) the clarity and ambiguity involved with the statement of the task, (2) the risk involved in the completion of the task, (3) the requirements for task completion called task boundaries, and (4) the accountability practices with which the teacher uses to establish and maintain student engagement. It is this last factor that this project is concerned.

Doyle (1979) pointed out that without accountability, the task system of a class is suspended and what actually occurs is attributed solely to the interests of the students. The main accountability system established in education is the performance-grade exchange. However, this traditional mechanism is not as clearly defined for physical education. Students rarely produce permanent products (e.g., written exam scores) of their subject matter engagement and teachers find it extremely difficult to use subject matter performance assessment as a means of accountability.

In physical education, students often negotiate tasks during practice by modifying the task, so it is extremely important to establish accountability mechanisms that are applicable during student engagement of physical education subject matter. To shift the accountability focus to real subject matter learning,
teachers need to become skilled and willing to use methods and techniques that will allow them the maximum opportunity to hold students accountable for what they do in class.

Promising data have emerged from work previously done in this area (Crouch, Ward, & Patrick, 1997; Griffin, Siedentop, & Tannehill, 1998; Patrick, Ward, & Crouch, 1998; Ward, Smith, & Sharp, 1997). Different accountability systems tested have shown varying levels of student performance. Using this evidence as a foundation, accountability is a variable that directly influences student performance in physical education.

One area of concern for physical education teachers has been the development of accurate and easy to use assessment techniques. Recently, there has been a more concentrated look into the assessment practices of teachers and those who teach them about assessment (Desrosiers, Genet-Volet, & Godbout, 1997; Veal, Russell, & Brown, 1996; Veal & Taylor, 1995). Educators have begun to implement new ways of assessing their students that rival the traditional test and re-test practices (Abendroth-Smith, Kras, & Strand, 1996; Block, Lieberman, & Connor-Kuntz, 1998; Hill & Miller, 1997; Lacy, 1995; Oslin, Mitchell, & Griffin, 1998; Schiemer, 1996; Schincariol & Radford, 1998).

Tousignant and Siedentop (1983) have categorized assessment in physical education as being both formal and informal. Unfortunately, most of the formal assessment (assessment that influences grades) is determined by the previously mentioned events of compliance. There is little formal assessment in physical
education that targets student performance (Lund, 1993; Matanin & Tannehill, 1994). Furthermore, Zhu (1997) stated that for assessment to be authentic, it must be performed in an on-going fashion within the setting where skills were intended to be performed. This is not always an easy task due to the nature of a physical education environment (Hastie, Sanders, & Rowland, 1998).

One of the most promising components of this strategy is how the actions of a teacher are the catalyst of change for student behaviors. Greenwood, Delquardi, and Hall (1984) point out that behavior is a result of the interaction between its antecedents (e.g., in a school setting this may be instruction style, class ecology, teacher behaviors) and its consequences. Most teachers, however, focus on the consequences as a means of changing the behavior of students. This is important as consequences may or may not have meaning or influence for all students in a class. Antecedents are more controllable for teachers wanting to change the behavior of their students and Siedentop (1986) noted that teachers can be trained to learn certain behaviors that are utilized during the process of teaching.

Armed with the notion of focusing on behavioral antecedents as the tactic for fostering behavior change, we can begin to isolate the behaviors that we know to have influences over students (Lacy, LaMaster, & Tommaney, 1996). First, there is the idea of formal assessment. It has been shown that formal assessment and grade distribution has an effect on the performance of students in class (Grehaigne & Godbout, 1998; Grehaigne, Godbout, & Bouthier, 1997; Kleinman, 1997; Matanin & Tannehill, 1994; Siegel, 1997). This project will focus only on
the antecedent of the formal grading process, assessment. Since, the outcomes of
the formal grade process (the grades themselves) may or may not be valued by the
students, the process of assessment becomes the more important facet to
investigate. Other teacher behaviors shown to affect student behavior are teachers’
active supervision patterns (including promotion, demonstrating, instructing,
observing, and off-task) (Rink, 1996; Siedentop & Tannehill, 2000; van der Mars,
Vogler, Darst, & Cusimano, 1994; 1998). These behaviors, classified as informal
assessments, can also affect student performance. Taking into consideration these
powerful teacher behaviors that have considerable effect on student behaviors, it
stands to reason that the combination of them would only strengthen their effect.
This research is based on the fact that little has been investigated with regards to
combining informal accountability strategies (i.e., active supervision behaviors)
with a model of formal assessment for the purpose of holding students accountable
for performance and participation in a physical education class.

Results of this study have important implications for helping teachers
develop skills to teach directly to standards and benchmarks, such as those
developed by NASPE (1995). Furthermore, this research may provide teachers with
an effective method of not only assessing and evaluating their students’
performances (Stiggins, 1997), but also to assess their own teaching and
curriculum. Teachers using actual student data can enhance their curriculum to
provide students with the most appropriate experiences possible (Sharpe, Spies,
Newman, & Spickelmier-Vallin, 1996). This concept is extremely important especially in the development of new teachers.

Recently, Greenwood and Maheady (1997) pointed out the fact that measurable change in student performance has become a lost benchmark in the development of teachers. The article recognizes the fact that although beginning teachers may not be able to implement sophisticated assessment strategies, these teachers should be expected to recognize the need for measuring pupil performance frequently as the basis for adapting and improving their teaching. It has been suggested that the most important facet related to effective teaching, beginning or expert, is student learning (Gusthart & Sprigings, 1989). This research attempted to address these facets by implementing an accountability system used to influence students' active and appropriate participation in varying components of physical education.

The purpose of this study was to investigate the functional relationship between a teacher mediated accountability system and its effect on student performance. Therefore, it was hypothesized that there is a strong functional relationship between the teachers' use of an on-going, in-class assessment technique and student performance in appropriate skill trials and involvement in MVPA during regularly scheduled physical education classes.
Participants & Setting

Students

Participants for this investigation were students (n=117) from two fourth grade (period 3 & 4) and two eighth grade (period 7 & 8) physical education classes from two schools in the Northwest United States. Student demographics include 84% Anglo-American, 9% Hispanic-American, 6% Asian-American, and 1% African-American.

Teachers

One certified, male middle school health and physical education teacher (Mr. Red) with 9 years of teaching experience and one certified, male elementary physical education teacher (Mr. Green) with 10 years teaching experience participated in the study. Both teachers also signed informed consent forms (Appendix A).
Program Content & Setting

This project took place in one rural middle school (Hilltop) and one rural elementary school (Woodland). Class size in the middle school averaged 31 students (range 23-39). Class size in the elementary school averaged 27.5 students (range 27-28). All lessons presented at both schools were conducted inside a gymnasium that provided enough room for all students to participate in lessons and both schools had an adequate amount of equipment relative to class sizes.

The middle school’s physical education program was a multi-activity/health education-based curriculum. During each 50 minute physical education lesson, students engaged in approximately 5 to 10 minutes of warm-up/fitness activities, 3 to 5 minutes of instruction or protocol discussion, 15 to 20 minutes of practice engagement, and 20 to 25 minutes of game play.

The time allotment for elementary physical education was much shorter. Each 25-minute lesson presented at the elementary school was designed to address one of two specific needs. Lessons were designed for involvement in either physical activity behavior (from a health perspective) or in the acquisition and practice of fundamental motor/sport skills. For activity lessons, students engaged in approximately 25 minutes of subject matter designed to have them actively moving. For skill acquisition lessons, students engaged in 5 to 10 minutes of fitness engagement, 3 to 5 minutes of class-wide skill instruction, and 10 to 15 minutes of modified game context that allowed for the application of the skills. Data for fitness engagement were collected during the specific fitness engagement
lessons, and skill data were collected during the activities or modified games of skill lessons.

**Target Behaviors**

For this study, two distinct dependent variables were selected. This study examined student performance, measured by the percentage of appropriate practice attempts of physical skills and student fitness engagement, measured by the interval percentage of students’ moderate to vigorous physical activity (MVPA) levels during their physical education classes.

Appropriate practice attempts were chosen as the variable of measure because of their strong correlation with student learning (Ashy, Lee, & Landin, 1988; Buck, Harrison, & Bryce, 1990; Silverman, 1985, 1990; Silverman, Subrananiam, & Woods, 1998). The determination of an appropriate skill attempt was defined by the completion of a set number of critical elements of a given skill. Students determined to be highly skilled were expected to complete all critical elements determined by the teacher for an attempt to be considered appropriate. Medium skilled students performed all but one critical element and low skilled students performed all but two elements. This criterion was also used for the collection of data. Both teachers constructed a critical element component list for a specific skill before each class. Critical elements for the elementary school lessons were selected from Pangrazi (1998). Middle school critical elements came from Pangrazi & Darst (1997). The predetermined critical elements served as a
guideline for teaching the skill and students were made aware of these elements as what they were being held accountable for learning. The teacher visually assessed the critical elements of the skills during participation. It was the teachers’ decision, based upon the cited literature, what components define an appropriate skill attempt. This allowed the teachers to design this performance criterion accountability measure to best fit their own needs.

Moderate to vigorous physical activity (MVPA) engagement was chosen as the second dependent variable given its positive relationship with health related benefits (USDHHS, 1996). Physical activity target behaviors were derived from a modification of the original System for Observing Fitness Instruction Time (SOFIT) activity categories (McKenzie, Sallis, & Nader, 1991).

**Intervention**

The intervention of this study included the use of an on-going, in-class assessment program. This specific accountability system involved the assessment and recording of student performance on both skill performance and physical activity involvement using hand-held critical element checklists and modified activity worksheets (Appendix B). When implementing the assessment condition, the teacher used these instruments throughout the lesson while monitoring the students’ participation engagement. Since this assessment practice has close ties with direct instruction, it is strictly the job of the teacher to perform the assessment.
during instruction. This is important since direct instruction has been shown to influence student participation positively (Sweeting & Rink, 1999). Teachers chose any number of students within the class for the daily assessments, but kept the identity of the students hidden until the end of the lesson. MVPA assessment was usually restricted to three students a period, but skill assessments were left to the discretion of the teacher as to how many students they could assess accurately.

The teachers used two different assessment sheets (Appendix B) to perform student assessment during the course of their already scheduled physical education classes. Students were made aware of the assessment during their class, but did not know who was specifically being assessed by the teacher during each class. As part of regular instructional practices, students were informed of exactly what the teacher assessed in regards to their performance. Students chosen for all data collection remained the same for each session, but the teacher secretly chose different students to assess during each day of the treatment. That is, the teachers integrated the assessment through their regular instructional efforts.

The sheet designed for skill assessment contained all of the students' names from the class being assessed. Following each name, there were 3 to 5 critical elements that the teacher designated to define an appropriate skill attempt. As teachers monitored the practice or game play segment of a lesson, they assessed each critical element with a “yes” or “no” (Y or N). This provided teachers with written documentation of the students' performance for that skill. Successful completion of a number of critical elements based on the ability level of the student
constituted an appropriate trial. As the teachers became more adept at using the assessment tools, whole skills were assessed with a "yes" or "no" response so that a teacher could assess more than one skill per lesson.

The sheet designed for MVPA assessment targeted students during the fitness component of their physical education lessons. During activity, the teacher was cued every 30 seconds by the pre-set alarm of a stopwatch, to view target students of their choosing. If, on the cue, the target students were moderately to vigorously active, a "y" was circled. If students were not moderately to vigorously active, an "n" was circled.

Research Design

A reversal design (A-B-A-B) was used to analyze the functional relationship between the teachers' use of on-going, in-class assessment and student performance. The reversal design is the most powerful single-subject design for illustrating a functional relationship between an environmental change and behavioral results (Cooper, Heron, & Howard, 1987). In a reversal design experiment, an initial baseline pattern of behavior is recorded followed by the introduction of an environmental change. Behavioral changes are noted and then the intervention is removed to see if behavior change is permanent. When behavior changes are noted during the return to baseline conditions, the intervention is reintroduced and changes are noted. This pattern continues until distinguishable behavior patterns are noted or permanently displayed.
Predetermined students were observed repeatedly across two different learning conditions. These conditions were as follows: (A) Baseline Phase: existing class structure including teachers using informal accountability systems (i.e., active supervision), such as verbal prompting, promoting and feedback and (B) Intervention Phase: a class being actively supervised by teachers who also incorporate the on-going, in-class performance assessment (i.e., formal accountability). Changes of experimental conditions were determined through the on-going analysis of emerging data paths.

Fidelity of Treatment

Fidelity of treatment, a method of assuring the experimental condition was implemented correctly and during the assigned sessions, was established with two separate precautions. First, the verification of the treatment condition was determined by the comparison of completed teacher assessment sheets to the condition recorded on the data collection sheets of the researcher. Days established to be in “B” condition should have been accompanied by a teacher assessment record to verify the fact that the assessment condition was in affect. Second, the assessments performed by the teachers were correlated with the data collected by the researcher and visually graphed to verify that the teacher was reasonably accurate in their assessment. The whole class percentage of appropriate skill attempts and MVPA involvement collected by the teacher was correlated and visually analyzed with the target student data collected by the researcher to
determine if the teacher was properly using the assessment tools. Although the correlation and analysis performed may be with data on different students, they should indicate similar changes across the experimental phases.

**Managing Potential Confounding Variables**

To ensure that the only clearly identifiable change to the instructional patterns of the teachers was the use of the assessment condition, data on teacher behaviors was also analyzed. To ensure that selected teacher behaviors (i.e., informal accountability), such as teacher movement, skill and activity promotion, demonstrating, instructing, observing, and off-task behaviors, remained relatively similar across all conditions, videotaped lessons were analyzed. This helped to ensure that any noted changes in student behavior did not coexist with any significant changes in teacher behavior except the use of the on-going, in-class assessment system.

Teacher behavior data consisted of purposeful movement and general teaching behaviors (including promotion, demonstrating, instructing, observing, and off-task) due to their strong correlation with student performance (van der Mars, Vogler, Darst, & Cusimano, 1994; Siedentop & Tannehill, 2000). Initially, teacher data was collected to establish baseline behaviors. Teacher data was only re-collected on the first days when either the intervention or baseline phase was initiated. This attempted to ensure that the independent variable is solely responsible for changes in student behaviors.
Teacher behaviors were collected through interval recording using a modified version of the SOFIT (McKenzie, Sallis, & Nader, 1991) teacher behavior categories (Appendix C). For collecting teacher movement data, each teacher wore an Optimal Health Products “Clicker” Pedometer. This pedometer measured the number of steps taken during each lesson and this number was then calculated into steps per minute to determine the rate of movement for each teacher. The accuracy of electronic pedometers has been shown useful in studies of physical activity in free-living populations (Bassett, et al, 1996).

Procedures

Prior to participation, all students and their parents or guardians signed an informed consent form approved by the Oregon State University Institutional Review Board (IRB) (Appendix A). From a sample of approximately 117 students (62 eighth graders & 55 fourth graders), any number of 12 participants were observed on videotape daily for this study. Both teachers in this study classified all students in the participating classes as either high, medium, or low skilled. For each class, one student was selected randomly for data collection from each of these three student groups for both skill and MVPA engagement.

Lessons were videotaped to capture the behaviors of the students and teachers. The camera was located in a corner of the two gymnasiums in a position where the researcher could capture most student and teacher behaviors.
Data Collection

A trained researcher performed all of the primary data collection. Data collection consisted of student and teacher data and, for both, included skill and fitness involvement components.

Data concerning physical activity involvement (MVPA) were collected during the time allotted for warm-up and fitness by the teacher. Data concerning skill acquisition were collected during practice and game playtime. Student data consisted of appropriate skill attempt percentage, collected using event-recording (van der Mars, 1989). Physical activity levels were recorded using a modified System for Observing Fitness Instruction (SOFIT) and momentary time sampling (McKenzie, Sallis, & Nader, 1991).

Within each observed class, high-, medium-, and low-skilled target students, for both skill activity and MVPA, were observed for data collection. They were only known by the researcher. The purpose of using varying skill level students was to account for any differences in the student/teacher interaction based on ability. Previous work has shown that teachers’ behavior differentially affects student outcomes relative to the ability level of the student (Pellett & Harrison, 1995a; 1995b; Rikard, 199; 1992).

For the collection of skill performance data, the researcher met with the teacher prior to the start of the lesson and recorded the critical elements that the teacher had determined to define an appropriate skill attempt for class that day.
Once the definition of an appropriate attempt was established, the researcher observed the three target students twice for two minutes as they performed in either a practice or game-play setting and recorded the outcomes on an event recording sheet (Appendix C). Inappropriate and appropriate skill trials were recorded. After each target student was observed for a total of four minutes, appropriate trial attempts were divided by total trial attempts to ascertain the percentage of appropriate skill trials. Each day that percentage was plotted for subsequent graphic analysis.

For collecting MVPA data, the researcher observed three target students in three-minute intervals during the entire fitness component of a lesson and recorded the outcomes on a modified SOFIT recording sheet (Appendix C). Physical activity target behaviors are derived from the modification of the original SOFIT activity categories (McKenzie, Sallis, & Nader, 1991). Behaviors 1-3 (lying down, sitting, & standing) were coded as “no” MVPA, and behaviors 4 and 5 (walking & very active) were coded as “yes” MVPA. Data were collected using momentary time sampling on ten second intervals. The intervals coded “active” were divided by the total intervals to obtain a percentage of intervals of MVPA for each student. Thus, each student was the unit of analysis.

Teacher data were collected for the purpose of determining whether or not the assessment intervention had any affect on the already existing teaching patterns of the participants. Data collected consisted of information regarding the movement of the teacher around the class setting and the amount and types of
general teaching behaviors (including promotion, demonstrating, instructing, managing, observing, and off-task) the teacher demonstrated during various portions of a lesson. The behavior of the teacher was recorded using interval recording (ten second intervals). Teacher behaviors were coded using the teacher behavior components of SOFIT (McKenzie, Sallis, & Nader, 1991) (Appendix C) and identified as one of the following: (1) promoting fitness or skill, (2) demonstrating fitness or skill, (3) general instruction, (4) management, (5) observation, or (6) off-task. Two independent researchers trained in using the SOFIT teacher behavior component observation method recorded this data. The observers were trained using independent physical education lesson videotapes until the observers and the primary researcher achieved a 90% agreement on the data.

Using a pedometer, teacher movement data were recorded immediately after each lesson and then calculated into steps per minute.

Teacher data was not analyzed beyond the comparison of raw data to ensure that the patterns of teacher behaviors and movement remain reasonably consistent across both experimental conditions.

After the final data emerged from this investigation, the primary investigator constructed an interview for the participating teachers to complete at the end of the study (Appendix D). The purpose of the interview was to gain any insight from the teachers regarding the use of the assessment intervention that may or may not have been evident through the student data.
Observer Training and Reliability

Observer reliability was established through interobserver agreements (IOA) checks. Prior to the start of data collection an observer, independent from the researcher of this project, was trained on already existing videotape of physical education lessons in the data collection procedures of this project until a 90% interobserver reliability rating was established. IOA checks were randomly performed during the length of the investigation to guard against observer drift. For each class of either MVPA or skill instruction taught by both teachers, one randomly selected session under each experimental condition was used for IOA analysis.

A minimum of 90% agreement was established for both teacher and student behaviors. IOA’s for teacher data were established using a scored interval (S-I) method (van der Mars, 1989). For student data, student skill trials were recorded from videotape and in the order that the trial occurred. IOA’s were determined using order of completion and appropriate/inappropriate criteria. MVPA IOA data was collected in much the same way. Intervals of MVPA recorded as “yes” or “no” were compared using a scored-interval (S-I) method (van der Mars, 1989).

Data Analysis

Data were plotted graphically and visually analyzed to determine if changes occurred, if changes were appreciable, and if the independent variable was the cause of these changes. Visual analysis included analysis of data variability within
and between phases to detect any confounding variables that might have influenced a change in the target behaviors other than the assessment condition. Analysis of between phase differences was also performed to analyze the effect of the introduction of the experimental variable. Shifts in data between phases were used to interpret the impact of the experimental variables. Overlaps in data between phases were interpreted to assess the changes in behavior between both conditions, and changes in data path trend were determined to note changes in conditions over different sessions. The first analysis of data occurred in establishing baseline. Stable baseline data provided a strong basis for attributing change to the effects of treatment. Data points of the baseline condition were visually analyzed to establish the absence of already existing improvement patterns, or wide degrees of variability within the baseline condition. This, coupled with any notable changes in the experimental condition, served as an illustration of the affect that an on-going, in-class assessment had on the fitness involvement and appropriate skill practice patterns of students in a physical education class.

In addition, the assessments performed by the teachers were correlated with the data collected by the researcher. The whole class percentage of appropriate skill attempts and MVPA involvement collected by the teacher was correlated with the target student data collected by the researcher to determine if the teacher was properly using the assessment tools. Although the correlation performed may be with data on different students, they should indicate changes across the experimental phases as they pertain to the class as a whole.
Results

Interobserver Agreements

A minimum of one interobserver agreement check (IOA) was performed for each class during each condition for student engagement in MVPA and skill performance. Classes were randomly selected from each group of appropriate sessions. The range for the overall IOA's was 91.34%-99.00% (see Table 1) with the MVPA IOA data ranging from 96.67% to 99.00%. The skill IOA data ranged from 91.34% to 96.25%. The IOA checks for the teaching behaviors were all 100%. Results of the IOA data suggest that the researchers conducting this study were sufficiently accurate in their data collection.
Table 1

Interobserver Agreement Percentages & Mean Values for MVPA & Skill Engagement

Hilltop Middle School

<table>
<thead>
<tr>
<th>Class &amp; Target Behavior</th>
<th>Conditions</th>
<th>Class Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>7th MVPA</td>
<td>100</td>
<td>96</td>
</tr>
<tr>
<td>8th MVPA</td>
<td>97.2</td>
<td>100</td>
</tr>
<tr>
<td>7th Skill</td>
<td>84.2</td>
<td>92.4</td>
</tr>
<tr>
<td>8th Skill</td>
<td>81.7</td>
<td>91</td>
</tr>
</tbody>
</table>

Woodland Elementary School

<table>
<thead>
<tr>
<th>Class &amp; Target Behavior</th>
<th>Conditions</th>
<th>Class Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>3rd MVPA</td>
<td>85</td>
<td>100</td>
</tr>
<tr>
<td>4th MVPA</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>3rd Skill</td>
<td>92</td>
<td>88</td>
</tr>
<tr>
<td>4th Skill</td>
<td>91</td>
<td>97</td>
</tr>
</tbody>
</table>

Conditions: A = Baseline: B = On-going, In-class Assessment
Fidelity of Treatment

Of the two fidelity of treatments measures used in this investigation, only one provided data for analysis. The first component, ensuring that the experimental condition was actually implemented on scheduled dates, was a comparison of collected teacher assessment sheets to the scheduled intervention (phase "B") days and lessons. In each case, the teachers completed the appropriate assessments for the scheduled day. This was verified by the researcher through the collection of the teacher assessment sheets for the purpose of calculating their accuracy.

The second measure produced an important finding for the study. The data revealed that the teachers performing the assessments in class could provide an accurate assessment of student performance. The visual analysis of plotted graphs showed that although the assessment and the student performance data was not necessarily performed on the same students, it did follow similar paths and changes across conditions. Of particular notice was the data concerning Woodland’s MVPA (Figures 1 & 2). In both classes (3rd & 4th), they emerged in very similar fashion. Since visual patterns of these assessment comparisons were determined to be very similar, a Spearman’s Rho Correlation was also used to determine the significance of the comparisons (Table 2). Mr. Green’s 3rd and 4th period classes were statistically significant at a .05 confidence level. Mr. Green’s 3rd and 4th period skill data comparisons were similarly impressive (Figures 3 & 4). In both classes, teacher and research data followed similar paths and level changes with the
exception of the second session. These were not statistically significant, but with an "N" of only 7, statistical significance was very difficult to achieve.

Hilltop’s MVPA data comparisons were not as clear as Woodland’s. For Mr. Red’s 7th period (Figure 5), the teacher assessments showed a great deal of variability while the research data stayed relatively constant. Mr. Red’s 8th period (Figure 6) comparisons showed the teacher and research data to be much more consistent. Hilltop’s skill data (Figures 7 & 8) showed to have the greatest differences in comparing teacher and research data. Both classes demonstrated little similarities between teacher assessments and research data.

Table 2
Spearman’s Rho Correlation Coefficient of Research & Teacher Data

<table>
<thead>
<tr>
<th>Teacher Assessments</th>
<th>3rd MVPA</th>
<th>4th MVPA</th>
<th>3rd Skill</th>
<th>4th Skill</th>
<th>7th MVPA</th>
<th>8th MVPA</th>
<th>7th Skill</th>
<th>8th Skill</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd MVPA</td>
<td>.786*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th MVPA</td>
<td></td>
<td>.818*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd Skill</td>
<td></td>
<td></td>
<td>.571</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th Skill</td>
<td></td>
<td></td>
<td></td>
<td>.238</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7th MVPA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.614</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8th MVPA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.282</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7th Skill</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.123</td>
<td></td>
</tr>
<tr>
<td>8th Skill</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.173</td>
</tr>
</tbody>
</table>

*p < .05
Figure 1  Mr. Green/Woodland "3rd" MVPA Assessment Comparison

Figure 2  Mr. Green/Woodland "4th" MVPA Assessment Comparison
Figure 3  Mr. Green/Woodland "3rd" Skill Assessment Comparison

Figure 4  Mr. Green/Woodland "4th" Skill Assessment Comparison
Figure 5  Mr. Red/Hilltop "7th" MVPA Assessment Comparison

Figure 6  Mr. Red/Hilltop "8th" MVPA Assessment Comparison
Figure 7  Mr. Red/Hilltop "7th" Skill Assessment Comparison

Figure 8  Mr. Red/Hilltop "8th" Skill Assessment Comparison
Managing Potential Confounding Variables

While it is important for any teacher to combine various components of effective teaching in their instruction, it was important for this study to identify the normally occurring pattern of these behaviors for both participating teachers. In an attempt to identify the assessment condition as the primary means of student behavior change, data were collected on other teaching behaviors that may have an effect on student performance.

Using the SOFIT teacher behavior category data collection procedure, data were collected for each teacher in both MVPA and skill engagement for all classes. Mr. Green’s MVPA behaviors showed interesting aspects (Figures 9 & 10). Although only two sessions of the target behaviors fell outside of the baseline ranges, all sessions recorded in the intervention phases were higher than the non-intervention phases. This indicated that the use of on-going in-class assessment may have increased the teaching behaviors of promoting and demonstrating with Mr. Green during fitness related lessons. Mr. Green’s behaviors during skill development lessons showed fewer changes (Figures 11 & 12). During skill instruction, Mr. Green’s teaching behaviors remained relatively constant across all conditions. The level changes and variability between phases were minimal, indicating that the teaching behaviors of Mr. Green changed very little during skill instruction.

Mr. Red’s teaching behaviors during fitness instruction was very low in all phases (Figures 13 & 14). Neither baseline nor assessment phases showed any type
of significant changes in the teaching protocol of Mr. Red. Data remained very stable across all conditions. Although both baseline phases of Mr. Red's skill instruction demonstrated a decreasing data path followed by slight level changes with the first intervention of the assessment condition, the remaining data differed little between phases (Figures 15 & 16). Data for both phases were consistent and did not extend beyond the limits of the original baseline data.

With the exception of Mr. Green's teaching behaviors during fitness instruction, the data showed that the only changes in the teaching behavior for both Mr. Green and Mr. Red across conditions was the use of on-going, in-class assessment. Therefore, with the exception of Mr. Green's fitness instruction classes, the data indicates that changes in overall teaching behaviors could be ruled out as a possible confounding variable to the experimental condition.

The second confounding variable investigated was teacher movement. In Mr. Green's case, he initially demonstrated a low level of movement but within the first five sessions of baseline for each class, his movement patterns (steps/minute) increased greatly (Figures 17 & 18). At the advent of the first experimental condition, another slight increase in teacher movement was noted for both classes, but from that point in the investigation, the movement pattern remained relatively constant. There were slight amounts of variability within each condition, but the addition and removal of the experimental condition had no bearing on this variability.
Both of Mr. Red's teacher movement data remained very constant throughout the investigation (Figures 19 & 20). This was evidenced by minimal variance and the absence of any level changes across conditions.

These data indicated that with the exception of the noticeable increase at the beginning of Mr. Green's teaching, the movement of both teachers remained sufficiently constant throughout the study. Thus, changes in movement patterns could be accounted for and removed as a possible confounding variable to the experimental condition.
Figure 9  Mr. Green/ Woodland “3rd” MVPA Teaching Behaviors

Figure 10  Mr. Green/ Woodland “4th” MVPA Teaching Behaviors
Woodland "3rd" Skill Teaching Behaviors

Figure 11  Mr. Green/Woodland "3rd" Skill Teaching Behaviors

Woodland "4th" Skill Teaching Behaviors

Figure 12  Mr. Green/Woodland "4th" Skill Teaching Behaviors
Figure 13  Mr. Red/Hilltop "7th" MVPA Teaching Behaviors

Figure 14  Mr. Red/Hilltop "8th" MVPA Teaching Behaviors
Figure 15  Mr. Red/Hilltop "7th", Skill Teaching Behaviors

Figure 16  Mr. Red/Hilltop "8th", Skill Teaching Behaviors
Figure 17  Mr. Green/Woodland "3rd" Teacher Movement

Figure 18  Mr. Green/Woodland "4th" Teacher Movement
Figure 19  Mr. Red/Hilltop "7th" Teacher Movement

Figure 20  Mr. Red/Hilltop "8th" Teacher Movement
Engagement in MVPA

Engagement in MVPA should be a major emphasis for any quality physical education program. This investigation targeted MVPA as one of its primary dependent variables because of its demonstrated relationship with health related benefits (USDHHS, 1996).

Target students (#'s 1, 2, & 3) in Woodland's 3rd period class produced mixed data in regards to their increased involvement in MVPA (Figure 21). Baseline data indicated a relatively high engagement in MVPA to begin with and changes in the experimental condition did little to alter performance. Of note however are the level changes that took place between sessions 10 and 11 and then again between sessions 11 and 12. In all three cases, the one session removal of the experimental condition seemed to reduce MVPA levels significantly. Student performance in session #11, a one-time removal of the assessment condition, was considerably lower than the surrounding assessment sessions. This may indicate a student behavior change due to a reduced level of accountability.

The same can be said for Woodland's 4th period class (Figures 22). In all cases (students 1, 2, & 3), no sizable changes in the data could be attributed to the addition or removal of the experimental condition except for session 11.

Student MVPA data from Hilltop period 7 also produced very few findings regarding the use of on-going, in-class assessment as a means to increase MVPA engagement. All three students within in the class recorded greatly variable levels of MVPA engagement and changes in the data levels were not consistent with
changes in the experimental condition (Figures 23). Visually, data within the experimental phases appear to be slightly higher than the baseline phases, but high levels of data overlap between phases indicate that these changes do not indicate significant changes in student behavior.

A similar trend was found for Hilltop’s 8th period students. Their engagement in MVPA was also quite varied and followed no pattern in regards to the use of on-going, in-class assessment (Figures 24). Students #1 & #3 in the class demonstrated a very high degree of variability in their MVPA engagement and therefore any changes in performance occur in no predictable pattern. Student #2 achieves a somewhat constant level of MVPA engagement that persists throughout the investigation. There are subtle, positive level changes at the beginning of each experimental condition, however decaying effects within each condition lessen the importance of these changes.
Figure 21 Woodland School "3rd" MVPA Data (Low, Med., & High Students)
Figure 22 Woodland School "4th" MVPA Data (Low, Med., & High Students)
Figure 23  Hilltop School “7th” MVPA Data (Low, Med., & High) Students
Figure 24  Hilltop School “8th” MVPA Data (Low, Med., & High Students)
Engagement in Appropriate Skill Trials

Engaging in appropriate skill trials has been found to be one of the most important facets to learning psychomotor subject matter in physical education (Silverman, 1985; 1990). Therefore, it would provide a sound argument to introduce methods that would help teachers engage their students more appropriately more often.

Woodland’s 3rd period class presented data that showed on-going, in-class assessment as a positive measure of engaging students into subject matter (Figure 25). For all three students in this class, sizable level changes occurred between the baseline and experimental phases. Although some variability and data overlap occurred, the experimental condition data is generally higher. With all three students, the first introduction of the experimental phase produced meaningful increases in student performance, and the second introduction of the assessment process produced the same effect to an even higher level. Of particular notice with this class was session 13. This session was a single session of baseline condition fit between two segments of experimental conditions. During this session pre-existing high performance levels dropped off significantly in all three students and then returned upon the implementation of the assessment condition.

Woodland’s 4th period class reported very similar data (Figure 26). For all three students, the data indicates increases in performance on days with the assessment condition being implemented. Sizeable level changes and low data overlap on the medium skilled student illustrate this point very clearly. To
compliment the previous findings of Woodland’s 3rd period class, again session 13 is of particular notice. Unlike 3rd period, 4th period did not engage in a single “B” condition day during the last five sessions of the investigation. Because of this, there were no significant decreases in student performance during session 13. This is of note because both classes engaged in identical lessons on the same day and produced very different data under the two separate conditions.

As strong as the Woodland data was at illustrating the usefulness of ongoing, in-class assessment as a means of student accountability, Hilltop’s data was equally inconclusive. All three students in Hilltop’s 7th period class produces such a high amount of data variability within and between conditions that no conclusions can be derived (Figure 27). Most phases of the investigation contained data that ranged from 0% to 100% of student engagement in appropriate skill attempts with no pattern that followed the experimental design.

Although Hilltop’s 8th period class did not produce as highly variable data as 7th period, its results are equally inconclusive (Figure 28). High levels of data variability with no particular pattern leaves no conclusions other than the experimental condition had no effect on student performance.

Teacher Questionnaires

To account for some of the components of this investigation not revealed by the direct observation data, both participating teachers were asked to complete an
exit questionnaire from the investigation (Appendix D). Results of these questionnaires uncover two very important similarities.

First, both teachers found the assessment procedures to be somewhat hindering at the beginning of the project, but grew into the process and found them to be relatively easy to implement in their teaching.

Mr. Green

"The use of the procedure during class took some getting used to; because it was not part of the everyday routine I had established for myself. After a few trials it fit into the routine with relative ease."

The second component uncovered by the exit interview was the idea of producing a more accountable and recognizable focus to the subject matter of physical education.

Mr. Red

"The use of critical elements (those behaviors being assessed) reinforces the desired outcomes of student performance and affords more formalized (read: less subjective, recorded, etc.) assessments and, thus, more accountability."
Figure 25 Woodland "3rd" Skill Data (Low, Med., & High Students)
Figure 26  Woodland “4th” Skill Data (Low, Med., & High Students)
Figure 27  Hilltop “7th” Skill Data (Low, Med., & High Students)
Figure 28  Hilltop "8th" Skill Data (Low, Med., & High Students)
Discussion

Fidelity of Treatment

The visual data and the statistical analysis of the fidelity of treatment demonstrated the teachers’ abilities to use on-going, in-class assessment. Most importantly, it showed that teachers have the ability to use this technique for authentic assessment purposes. The elementary school setting (Woodland) proved to have a stronger representation of the teacher’s assessment matching the research data. The fact that the elementary lessons were more teacher directed and group oriented provides a higher probability that the students being assessed by the teacher and the students being used for data collection were performing the same types of tasks as the same time. Since the comparisons of the teacher data and the research data were done on different students, this is the setting where the assessments would have been expected to be the closest. This was certainly the case. Not only is this evident through visual analysis of the graphed data, but it also proves to be statistically significant in assessing the MVPA of students at Woodland School.

The middle school setting (Hilltop) allowed students to have more choice in the direction that they take in class, therefore it would be more likely that two different students would be doing two different things while being assessed. None of the data from this setting proved to be statistically significant, and the visual data suggests that the assessments were somewhat a weaker accountability system. This
may be explained by the general absence of informal assessment strategies in many of the middle school lessons.

These findings need to be further investigated as they were not the primary concern of this investigation and the comparisons made here were on assessments done for different students. However, this may point out promise in using ongoing, in-class assessment as a viable means of collecting reliable information regarding the performance of students participating in physical education. These findings support a very important facet of teaching in physical education. Teachers can be presented with alternative assessment techniques and they can learn to use them effectively in classroom situations. This mirrors the suggestions of Matanin and Tannehill (1994) and Zhu (1997) who advocate changing the existing structure of assessment in physical education. Also, the particular assessment devices used for this investigation will lend themselves to accurately assessing a large number of students which is a concern for any teacher (Lacy, 1995).

Managing Potential Confounding Variables

In investigating potentially confounding variables of this investigation, it was discovered that the assessment strategy had little effect on the pre-existing teaching behaviors of the participants. Very few of the level changes in teaching behaviors followed any consistent patterns that coincided with changes in the experimental conditions. The only exception to this was noted with Mr. Green in the Woodland School MVPA data. The “B” conditions were consistently higher in
promotion and demonstration than the baseline phase, but none of the “B”
conditions data points fell outside of the range of the original baseline data.
Therefore, it can be concluded that any differences in teaching behaviors were not a
result of the introduction or removal of the experimental condition, but likely other
contextual factors. This is a crucial element to this investigation. Since teaching
behaviors have been so highly correlated to student performance (Lacy, LaMaster,
& Tommaney, 1996; Sweeting & Rink, 1999; Siedentop & Tannehill, 2000), it is
important to know that the use of formal on-going, in-class assessment need not
deter teachers from their normal routines.

The other confounding variable that was monitored in this investigation was
the rate of movement by the teachers throughout their lessons. In the case of Mr.
Green, the data indicated that he began the investigation at a low level, but quickly
increased his movement rate. This increase occurred very early in the investigation
and soon after this increase, his movement patterns leveled off and remained
constant throughout the rest of the investigation. The variability in the data did not
follow any pattern that would connect it to the changes in the experimental
condition. The data for Mr. Red was unchanged throughout the entire study. His
movement rates remained at a relatively similar level through all conditions of the
study indicating that the experimental condition was not influenced by an increase
or decrease in teacher movement.

After analyzing the data concerning the movement and teaching behaviors
of the two participating teachers, it has been shown that the use of an on-going, in-
class assessment had little effect on pre-existing movement patterns. This portion of the investigation is important to realize due to the relationship that exists between a teacher's movement patterns and their effects on student performance (Doyle, 1986; van der Mars, Vogler, Darst, & Cusimano, 1994).

The knowledge that a teacher can use this method of assessment and still be able to function in their "regular" instructional teaching behaviors is positive development. This will allow teachers to be more comfortable with trying new assessment strategies with out the fear of being removed from engaging with their students.

On-going, In-class Assessment as a Method of Accountability

As previously stated, the use of on-going, in-class assessment as a means of accountability for both student engagement in MVPA and appropriate skill trials produced mixed results. Target students throughout the study illustrated varying effects and consistent patterns of student behavior did not occur on a regular basis. However, aspects of this investigation need to be highlighted.

First, we must consider the aspect of context in regards to the different learning environments. Siedentop and Tannehill (2000) provides us with a clear definition of how tasks get accomplished in physical education and part of that equation is the context of the environment where tasks are to be completed. Much of the skill data for this experiment was collected over a long period and within that
time frame, both teachers presented skill lessons under very different environmental factors. Some days, students were practicing skills in small groups or by themselves, and on other days, these skills were being practiced in more of a game setting. This was very evident at Hilltop school where skill data variability often varied from zero to 100 percent in a very short time frame. On days when skill practice was taking place in small groups, the Hilltop students were often very successful in performing the critical elements of a skill. On days where game play was the scheduled vehicle for skill engagement, not only did the number of attempts decrease significantly, but the success of the attempts also decreased. This problem of controlling for context existed at Woodland school as well, but not to the same degree. This was evident in the data, which exhibited more change due to the changes in the experimental condition.

Another aspect of this investigation to consider was the intervention itself. Using Greenwood, Delquardi, and Hall's (1984) description of a three-term contingency, this investigation used only the antecedent of the formal assessment process as its independent variable. The primary focus of the intervention was the teacher performing the process of assessment on students. Very little consideration was made in developing systematic student feedback or attaching this assessment to the formal grade exchanges in the participating classes. This may have profound effect on the use of this assessment technique as a method of accountability. If students are provided with a more structured method of feedback regarding their
performance and then how that performance affects their formal grade, this technique may have a more substantial effect.

A final aspect to consider was the method of establishing appropriate and inappropriate skill attempts for collecting data. It was established to develop a sliding criterion for determining appropriate skill attempts for the teacher assessments and this criterion was used for the research data. In hindsight, it would have been better to use a straight performance scale for collecting research data. Since the students never saw the data, fairness to ability should not have been a consideration. Portions of the skill data may have been skewed due to the sliding performance data collecting method. Lower skilled students were given credit for high levels of success when in reality, their performance was very poor. Actual improvements in student performance may have gone undiscovered due to the fact that the sensitivity of the collection procedures was reduced.

In regards to the engagement of students in MVPA, both settings showed that the different levels of students responded differently to the intervention. Again, the context of the different settings likely played a part. Where Woodland School used very structured fitness lessons, Hilltop allowed students to work independently on a series of given fitness tasks with the relative absence of any active supervision patterns. Under such different contexts, student performance was affected based on structure.

Another concept considered in this investigation was the effect that the intervention had on high, medium, and low skilled students in both MVPA and skill
trials. Although previous research has stated that different level students respond differently to teacher behaviors (Pellett & Harrison, 1995a; 1995b; Rikard, 1991; 1992), this investigation provided no data to support this notion. There were no consistent patterns in any of the collected data to suggest that the intervention was received differently by high, medium, or low skilled students. However, this investigation did not note the direct behavioral interaction between the teachers and the target students. These patterns may have played a large part in how different students respond to the intervention.

Conclusions

Based on the design, limitations, and data of the study, two conclusions are presented. There are certain aspects of the results that would suggest that on-going, in-class assessment is a viable means for holding students more accountable during physical education. However, there is also evidence that an on-going, in-class assessment that is not directly tied to grading practices has no immediate effect on student performance.

Although the primary focus of this investigation produced mixed results, this research did demonstrate teachers' ability to interlace on-going assessments with instructional strategies. Results of this study suggest that this type of assessment may be easily and accurately administered by teachers during their regularly planned classes.
Implications

Further recommendations for future research in this are exciting and have the promise to be very productive. Future research needs to first replicate the investigation done here in a myriad of environments to gain a better understanding of how this might affect different teachers and students. The assessment process of this investigation needs to be evolved to include systematic feedback and be tied to formal grade exchanges. Lastly, although it may endanger the ecological validity of the investigation, this research needs to be conducted in environments where the contextual factors of skill and MVPA engagement are reduced. Hopefully, through further investigations we can begin to better equip teachers to not only keep their students engaged in high levels of subject matter, but also be able to collect and utilize information regarding this lost facet of physical education; student learning.


Appendices
Appendix A
The use of on-going, in-class assessment as a method of accountability during physical education

1. Dr. Hans van der Mars, Associate Professor at Oregon State University (OSU), and Michael Wright, Doctoral Student at OSU, have requested my participation in a research study conducted at OSU with the cooperation and assistance of a public middle school. The purpose of this study is to examine the effects of an on-going, in-class, performance assessment accountability system on student performance of physical skills during physical education classes.

2. I will be guided in using active supervision, performance feedback, and performance assessment accountability systems with my students during physical education lessons.

3. One trained observer (OSU Exercise and Sport Science Graduate Student, Michael T Wright) will systematically observe the classes and collect data. While the observer will assist in data collection, only the researchers will have access to the data: identification codes will be established for the teachers and students. Neither the teachers nor the students will be referred to by name during the research or publication process.

4. There are no foreseeable risks, beyond those normally associated with teaching physical education, associated with this study. I do understand that I will be asked to use active supervision and accountability system strategies, use a watch with an audio cue, and a wireless microphone during lessons when data are collected.

5. While I will not receive tangible benefits, (e.g., remuneration) for participation, I will gain an understanding of the effect that active supervision and accountability systems have on students performing physical skills and engaging in physical activity in physical education. Furthermore, I realize that the resulting data will add to a knowledge base on teachers’ accountability systems and assessment and the relationship these hold to better guiding students through appropriate activities in physical education.

6. I understand that the results of the research study may be published but that my name or identity will not be revealed. In order to maintain confidentiality, Dr. van der Mars and Mr. Wright will utilize a coding system that identifies me only by a code symbol. Only Dr. van der Mars and Mr. Wright will have access to this confidential information, which will be kept, on file in a secure location in the Instructional Analysis Laboratory in the College of Health & Human Performance at Oregon State University.
7. I understand that the physical education lessons that I will be teaching in this project will be videotaped. Video taped lessons will only be watched by Michael Wright and Hans van der Mars and will be kept in the Instructional Analysis Laboratory at OSU. At the conclusion of the project, videotapes containing lessons will be erased.

8. I have informed Dr. van der Mars and Mr. Wright that I have no documented medical condition (ones that would restrict my active duties as a physical education teacher) that might pose a risk for participation in this study.

9. I have been informed that I will not be compensated for participation in this study.

10. I have been advised that the research in which I will be participating does not involve more than the normal risk involved in teaching physical education.

11. I have been informed that any questions I have concerning this research project before or after my consent will be answered by Dr. van der Mars (phone 541-737-4649) or Mr. Wright (phone 541-737-6791).

12. I understand that if I have questions about my rights as a participant in this research, I can contact Mary Nunn, Sponsored Programs Officer of the OSU Research Office (phone 541-737-0670).

13. I have read the above informed consent. The nature, demands, risks, and benefits of the project have been explained to me. I understand that I may withdraw my consent and discontinue participation at any time without penalty or loss of benefit to me. A copy of this consent form will be given to me.

Teacher

Teacher’s Signature ___________________ Date ________________

I, Hans van der Mars or Michael Wright certify that I have explained to the above individual the nature and purpose, the potential benefits, and possible risks associated with participation in this research project, have answered any questions that have been raised, and have witnessed the above signature and have provided the participant a copy of this signed consent document.

On-site Investigator

Signature ___________________ Date ________________
The use of on-going, in-class assessment as a method of accountability during physical education

1. Dr. Hans van der Mars, Associate Professor at Oregon State University (OSU), and Michael Wright, Doctoral Student at OSU, have requested my child’s participation in a research study. The title of the research is “The use of on-going, in-class assessment as a method of accountability on the opportunity to respond during physical skill practice in physical education.”

2. I have been informed that the purpose of this research is to examine a teaching strategy that might hold students more accountable for learning physical skills and engaging in physical activity during physical education classes.

3. My child’s participation will involve performing regular physical activity tasks during his or her regular physical education classes.

4. I understand that there are no foreseeable risks or discomforts to my child beyond those normally associated with regular participation in their physical education classes.

5. I understand that the possible benefits of my child’s participation in the research are a possible increase in learning during physical education, a possible increase in the involvement of physical skills and fitness tasks, and an overall improvement in daily physical education instruction.

6. I understand that the results of the research study may be published but that my child’s name and identity will not be revealed. In order to maintain confidentiality, Dr. van der Mars and Mr. Wright will utilize a coding system that identifies my child only by a code or symbol. Only Dr. van der Mars and Mr. Wright will have access to this confidential information that will be kept on file in a secure location in the Instructional Analysis Laboratory in the College of Health & Human Performance at Oregon State University.

7. I understand that this research project involves the videotaping of physical education classes that my child will be involved in. The tapes of these lessons will only be watched by Hans van der Mars or Michael Wright, and kept in the Instructional Analysis Laboratory on the campus of OSU. At the conclusion of the project, videotapes containing lessons will be erased.
8. I have been advised that the research in which my child will be participating does not involve more than minimal risk.

9. I have been informed that my child and I will not be compensated for my child's participation.

10. I have been informed that any questions I have concerning this research project, before or after my consent, will be answered by Dr. van der Mars (phone 541-737-4649) or Mr. Wright (phone 541-737-5932).

11. I have informed Dr. van der Mars and Mr. Wright that my child has no documented medical condition (one that poses a risk to regular participation in their physical education classes) that might pose a risk for participation in this study.

12. I understand that if I have any questions about my rights or my child’s rights as a participant in this research project, I can contact Mary Nunn, Sponsored Programs Officer, OSU Research Office. (phone 541-737-0670).

13. I have read the above informed consent. The nature, demands, possible risks, and benefits of the project have been explained to me. I knowingly assume the risks involved, and understand that I may withdraw my consent and discontinue my child’s participation at any time without penalty or loss of benefit to me or my child. A copy of this consent form will be given to me.

Child’s Name __________________ Parent’s Name __________________________

Parent’s Signature __________________________ Date ____________

Child’s Signature __________________________ Date ____________

I, Hans van der Mars or Michael Wright, certify that I have explained to the above individual the nature and purpose, potential benefits, and possible risks associated with participation in this research project, have answered any questions that have been raised, and have witnessed the above signature. I have also provided the participant a copy of this signed consent document.

On-site Investigator __________________________ Date ____________

Signature ________________________________

TO Hans van der Mars, ExSS
COPY Michael 1 Wright, ExSS
RE The use of on-going, in-class assessment as a method of accountability for skill performance and fitness involvement during physical education

The referenced project was reviewed under the guidelines of Oregon State University's Committee for the Protection of Human Subjects and the U.S. Department of Health and Human Services. The committee has approved your application. The approval of this application expires upon the completion of the project or one year from the approval date, whichever is sooner. The informed consent form obtained from each subject should be retained in program/project's files for three years beyond the end date of the project.

Any proposed change to the protocol or informed consent form that is not included in the approved application must be submitted to the IRB for review and must be approved by the committee before it can be implemented. Immediate action may be taken where necessary to eliminate apparent hazards to subjects, but this modification to the approved project must be reported immediately to the IRB.

Date: 07/28/99
Warren N. Suzuki, Chair
Committee for the Protection of Human Subjects
(Education, 7-6393, suzukiw@orst.edu)
Student Activity Level Assessment

Date: ___________ Grade: ___________ Observer: ___________

Activity/Lesson

Teacher: ___________ Class: ___________

Start Time: ___________ End Time: ___________ Total Time: ___________

MVPA = Moderate to Vigorous Physical Activity
(Walking or any activity that would require more energy than walking)

<table>
<thead>
<tr>
<th>Interval</th>
<th>Name:</th>
<th>Name:</th>
<th>Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Y / N</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>2</td>
<td>Y / N</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>3</td>
<td>Y / N</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>4</td>
<td>Y / N</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>5</td>
<td>Y / N</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>6</td>
<td>Y / N</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>7</td>
<td>Y / N</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>8</td>
<td>Y / N</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>9</td>
<td>Y / N</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>10</td>
<td>Y / N</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>11</td>
<td>Y / N</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>12</td>
<td>Y / N</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>13</td>
<td>Y / N</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>14</td>
<td>Y / N</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>15</td>
<td>Y / N</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
</tbody>
</table>

Totals /15 /15 /15
Physical Education Skill Performance Checklist

Class ___________________________  Date ___________________________
Grade Level ________________  Skill Observed ____________________________

Critical Elements or Skills Observed

<table>
<thead>
<tr>
<th>Student</th>
<th>Y</th>
<th>N</th>
<th>Y</th>
<th>N</th>
<th>Y</th>
<th>N</th>
<th>Y</th>
<th>N</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Student MVPA Observation Sheet

**Teacher** __________________________________________________  **Observer** __________________________________________________

**Class** ____________________  **Grade** ________  **Date** __________

**Lesson** _______________________________________________________________

**Start Time** __________  **End Time** __________  **Total Time** __________

## Student # 1

<table>
<thead>
<tr>
<th>Interval</th>
<th>MVPA</th>
<th>Interval</th>
<th>MVPA</th>
<th>Interval</th>
<th>MVPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0:00</td>
<td></td>
<td>3:00</td>
<td></td>
<td>6:00</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Y / N</td>
<td>1</td>
<td>Y / N</td>
<td>1</td>
<td>Y / N</td>
</tr>
<tr>
<td>2</td>
<td>Y / N</td>
<td>2</td>
<td>Y / N</td>
<td>2</td>
<td>Y / N</td>
</tr>
<tr>
<td>3</td>
<td>Y / N</td>
<td>3</td>
<td>Y / N</td>
<td>3</td>
<td>Y / N</td>
</tr>
<tr>
<td>4</td>
<td>Y / N</td>
<td>4</td>
<td>Y / N</td>
<td>4</td>
<td>Y / N</td>
</tr>
<tr>
<td>5</td>
<td>Y / N</td>
<td>5</td>
<td>Y / N</td>
<td>5</td>
<td>Y / N</td>
</tr>
<tr>
<td>6</td>
<td>Y / N</td>
<td>6</td>
<td>Y / N</td>
<td>6</td>
<td>Y / N</td>
</tr>
<tr>
<td>1:00</td>
<td></td>
<td>4:00</td>
<td></td>
<td>7:00</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Y / N</td>
<td>1</td>
<td>Y / N</td>
<td>1</td>
<td>Y / N</td>
</tr>
<tr>
<td>2</td>
<td>Y / N</td>
<td>2</td>
<td>Y / N</td>
<td>2</td>
<td>Y / N</td>
</tr>
<tr>
<td>3</td>
<td>Y / N</td>
<td>3</td>
<td>Y / N</td>
<td>3</td>
<td>Y / N</td>
</tr>
<tr>
<td>4</td>
<td>Y / N</td>
<td>4</td>
<td>Y / N</td>
<td>4</td>
<td>Y / N</td>
</tr>
<tr>
<td>5</td>
<td>Y / N</td>
<td>5</td>
<td>Y / N</td>
<td>5</td>
<td>Y / N</td>
</tr>
<tr>
<td>6</td>
<td>Y / N</td>
<td>6</td>
<td>Y / N</td>
<td>6</td>
<td>Y / N</td>
</tr>
<tr>
<td>2:00</td>
<td></td>
<td>5:00</td>
<td></td>
<td>8:00</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Y / N</td>
<td>1</td>
<td>Y / N</td>
<td>1</td>
<td>Y / N</td>
</tr>
<tr>
<td>2</td>
<td>Y / N</td>
<td>2</td>
<td>Y / N</td>
<td>2</td>
<td>Y / N</td>
</tr>
<tr>
<td>3</td>
<td>Y / N</td>
<td>3</td>
<td>Y / N</td>
<td>3</td>
<td>Y / N</td>
</tr>
<tr>
<td>4</td>
<td>Y / N</td>
<td>4</td>
<td>Y / N</td>
<td>4</td>
<td>Y / N</td>
</tr>
<tr>
<td>5</td>
<td>Y / N</td>
<td>5</td>
<td>Y / N</td>
<td>5</td>
<td>Y / N</td>
</tr>
<tr>
<td>6</td>
<td>Y / N</td>
<td>6</td>
<td>Y / N</td>
<td>6</td>
<td>Y / N</td>
</tr>
</tbody>
</table>

**Intervals Observed**  **Intervals Observed**  **Intervals Observed**

**Intervals MVPA**  **Intervals MVPA**  **Intervals MVPA**

**% of MVPA**  **% of MVPA**  **% of MVPA**
# Students' Skill Performance Observation Sheet

Teacher: 

Date: 

School: 

Lesson: 

Observer: 

<table>
<thead>
<tr>
<th>Critical Elements/Skill Observed</th>
<th>Appropriate Attempts</th>
<th>Inappropriate Attempts</th>
<th>Totals</th>
<th>% of Appropriate Attempts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Student #1</td>
<td>Student #1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Student #2</td>
<td>Student #2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Student #3</td>
<td>Student #3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Teacher Behavior Observation Form

**Teacher** ____________________  **Observer** ____________________

**Class** ____________________  **Grade** ______  **Date** ______

**Lesson** ______________________________________

**Start Time** ______  **End Time** ______  **Total Time** ______

<table>
<thead>
<tr>
<th>Intervals (Minutes)</th>
<th>Location</th>
<th>Teacher Behavior</th>
<th>Notes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0:00</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
<tr>
<td>1:00</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
<tr>
<td>2:00</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td><strong>P D I M O T</strong></td>
<td></td>
</tr>
</tbody>
</table>

(Continued for 12 minutes)

<table>
<thead>
<tr>
<th>Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P:</strong> Promotes Skill/Act.</td>
</tr>
<tr>
<td><strong>D:</strong> Demonstrates Skill/Act</td>
</tr>
<tr>
<td><strong>I:</strong> Instruction</td>
</tr>
<tr>
<td><strong>M:</strong> Management</td>
</tr>
<tr>
<td><strong>O:</strong> Observes</td>
</tr>
<tr>
<td><strong>T:</strong> Off-Task</td>
</tr>
</tbody>
</table>
On-Going, In-Class Assessment Research Exit Questionnaire

1. How worthwhile was your involvement in this investigation?

2. What was the most difficult thing about your involvement in this project?

3. What, if anything was difficult about actually using the Time Sampling procedure for collecting the student activity level data?

4. What is the likelihood of continuing using the on-going, in-class assessments in your classes? How?

5. What benefits did you discover in using on-going, in-class assessments in your teaching? What were some difficulties?

6. Did the use of the assessments help you discover anything about your students that you did not previously realize?

7. Did the assessments uncover anything about your teaching that you were previously unaware of? How about your curriculum?

8. How might you change the assessment process to accommodate the needs of public school teachers?

9. Given the move in the State of OR toward standards based assessment, how do you see these assessment approaches as a possible means of:
   (a) helping students reach acceptable standards of performance?
   (b) putting more teeth behind a PE program's grading practices?
Mr. Green's On-Going, In-Class Assessment Research Exit Questionnaire

1. How worthwhile was your involvement in this investigation?

Our school, which is k-4 will be a 2-5 next year. This project will lend a hand at grading procedures for the fifth grade. It will give some validity to the grades assigned to students. I thought that the timing of this research was wonderful for myself and my students.

2. What was the most difficult thing about your involvement in this project?

This project was not difficult for me. Mike has all of the forms and papers for me to use. We modified the forms somewhat but it was pretty easy; thanks to Mike.

3. What, if anything was difficult about actually using the Time Sampling procedure for collecting the student activity level data?

The use of the procedure during class took some getting use to; because it was not part of the everyday routine I had established for myself. After a few trials it fit into the routine with relative ease.

4. What is the likelihood of continuing using the on-going, in-class assessments in your classes? How?

There is a very strong likelihood that I will continue to use this procedure for my fourth and fifth grade students next year. Then the following year the whole school will be incorporated. The fitness level of my students is very important to me. This procedure will ensure that I am becoming a better teacher.

5. What benefits did you discover in using on-going, in-class assessments in your teaching? What were some difficulties?

I am a command style teacher. This project enabled me to step back and let the students have more ownership in their fitness levels. At first this was difficult for me, but as time went on I felt myself and my students were being held more accountable for the out-comes.

6. Did the use of the assessments help you discover anything about your students that you did not previously realize?

I think that it helped me validate what I had thought about some of my lower level students. It helped me to encourage them more on their effort each day.
7. Did the assessments uncover anything about your teaching that you were previously unaware of? How about your curriculum?

I talked about the command style before (question 5). I also found that some of my lessons were a lot less active than I had thought. It make me modify some lessons to obtain the same objectives. In point, it made me a better teacher.

8. How might you change the assessment process to accommodate the needs of public school teachers?

I think that Mike and I did change some of the forms to make them more user friendly. In-servicing teachers on the “How’s and Why’s” would be one way to accommodate public school teachers. Showing them that validity makes us all more accountable.

9. Given the move in the State of OR toward standards based assessment, how do you see these assessment approaches as a possible means of:

(a) helping students reach acceptable standards of performance?

It would show students exactly where they are in terms of performance standards. Help them rise to an acceptable level with constant feedback from written documentation.

(b) putting more teeth behind a PE program's grading practices?

When the state feels that Physical Education is important enough to have benchmarks; this will be a very useful way to ensure student success. It would lend credibility to all PE programs.
Mr. Red On-Going, In-Class Assessment Research Exit Questionnaire

1. How worthwhile was your involvement in this investigation?

Very. It helped to confirm some of my own ideas about assessment as well as give me an opportunity to put into practice some concrete assessment practices. Using your tools, I was able to glean some enhanced methods as well as modify some of my own.

2. What was the most difficult thing about your involvement in this project?

There were times when I felt the mechanics of the project were not entirely conducive to the activities I had planned. With time, this minimized and the project was fairly transparent.

3. What, if anything was difficult about actually using the Time Sampling procedure for collecting the student activity level data?

As in #2, there were times when incidents (distractions, misbehaviors, etc.) interrupted the measurements. Overall, however, the time sampling allowed me to "notice" students in greater detail.

4. What is the likelihood of continuing using the on-going, in-class assessments in your classes? How?

I have already begun to use some of the methodology. It has allowed me to formalize some of the assessments I had done previously and I plan to include use of some of the tools, from the study, in the future.

5. What benefits did you discover in using on-going, in-class assessments in your teaching? What were some difficulties?

More awareness and more specific analysis of student performance. I think it also helped the students focus on skill performance, due to a greater focus on critical elements of those skills. As for difficulty, there was some "hindering" of free movement and awareness of the overall class environment, as I was highly focused on the activity directly in front of me. This, I feel, dissipated with continued use.

6. Did the use of the assessments help you discover anything about your students that you did not previously realize?

I would say it confirmed many things (i.e. behaviors, effects of
focused practice, etc.) rather that having lead to new discoveries.

7. Did the assessments uncover anything about your teaching that you were previously unaware of? How about your curriculum?

Again, I think it reaffirmed that some of my practices were effective and helped me further develop those in need of shoring up. I feel my class awareness increased, as a result of my participation in the study.

8. How might you change the assessment process to accommodate the needs of public school teachers?

I think the tools used are easily adaptable to assess behaviors in any arena.

9. Given the move in the State of OR toward standards based assessment, how do you see these assessment approaches as a possible means of:

   (a) helping students reach acceptable standards of performance?
   The use of critical elements (those behaviors being assessed) reinforces the desired outcomes of student performance.

   (b) putting more teeth behind a PE program's grading practices?

Affords more formalized (read: less subjective, recorded, etc.) assessments and, thus, more accountability.
Today's educators are faced with a great deal of obstacles when it comes to engaging students in the classroom. More than ever, teachers are asked to be all things to all students. Teachers take on the role of educator, counselor, parent, and even friend to their students. One thing must remain clear however, the primary purpose of a teacher is to engage students in the appropriate subject matter. With this in mind, the primary mission of teachers should focus them on methods and strategies that will better allow them to challenge students with meaningful tasks.

With the recent advent and promotion of authentic assessment, such as NASPE's (1995) standards and benchmarks, and the call to engage students in more health-related physical activity (USDHHS, 1996), there is a need to develop strategies that hold students accountable for learning and participation during physical education. All too often, students in physical education classes are only accountable for tasks such as attendance, dressing out, and maintaining positive behavior. According to Doyle (1977, 1986), educational tasks, and the accountability under which they are presented, represent the functional framework of any student/teacher interaction in terms of how tasks get accomplished. This framework is most clearly described for physical education by Siedentop and Tannehill (2000) who describes the student/teacher interaction as a dual directional negotiation of presented tasks.
Siedentop and Tannehill (2000) identifies three distinct systems in which tasks are presented. They include the managerial, instructional, and student-social task system. Within each system, tasks are presented by the teacher and then negotiated by students. The original stated tasks become actual tasks through a simple cycle of stated task, student response, teacher supervision and response to the performed task.

According to Siedentop and Tannehill (2000), four factors influence the student response to a stated task. These factors include the clarity and ambiguity involved with the statement of the task, the risk involved in partaking in the completion of the task, the requirements for task completion called task boundaries, and the accountability practices with which the teacher uses to establish and maintain student responsibility for appropriate task involvement and outcomes. It is this last factor that this project is concerned.

Doyle (1979) pointed out that without accountability, the task system of a class is suspended and what actually occurs is attributed solely to the interests of the students. The main accountability system established in education is the performance/grade exchange. For example, in a math class, a teacher assigns work, the work is completed by the student, and the teacher will give that work some sort of numerical value that represents the students ability to meet the teacher set criteria. However, this traditional mechanism is not as clearly defined for physical education. Students rarely produce a permanent product of their subject
matter engagement and teachers find it extremely difficult to use subject matter performance assessment as a means of accountability.

In physical education, students often negotiate tasks during practice by modifying performance, so it stands to reason that it is extremely important to establish accountability mechanisms that are applicable during student engagement of physical education subject matter.

Greenwood, Delquardi, & Hall (1984) point out that behavior is a result of the interaction between its antecedents (in a school setting this may be instruction style, class ecology, teacher behaviors, etc.) and its consequences. Unfortunately, for changing the behavior of students, most teachers focus on the consequences as a means of change. This is important as consequences may or may not have meaning or influence for all students in a class. The other side of this equation is more controllable for teachers wanting to change the behavior of their students. Siedentop (1986) has stated that teachers can be trained to learn certain behaviors that are utilized during teaching. If this is true, and we are able to identify those behaviors that most positively affect the participation of students, then it should reason that our emphasis should pertain to teaching skills that improve the quality of physical education.

Armed with the notion of focusing on behavioral antecedents as the method of behavior change, we should begin to isolate the behaviors that we know to have influences over students (Lacy, LaMaster, & Tommaney, 1996). To shift the accountability focus to real subject matter learning, teachers need to be exposed to
methods and techniques that will allow them the maximum opportunity to hold students accountable for what they do in class.

Accountability has been defined for the purposes of educational settings as instructional practices used to establish and maintain student responsibility for behaviors, task involvement, and outcomes (Siedentop & Tannehill, 2000). This serves as a guideline for this review of previous work completed and findings reported regarding accountability and teaching.

Setting the stage for the work done on accountability in education was Doyle. Doyle (1977; 1979; 1986) defined a serious of task systems that define the teacher/student relationship in regards to task completion, behavioral management, and social interactions. His work prescribed the notion that students negotiate with teachers on the expected outcomes of a system based on three concepts. These concepts, ambiguity, risk, and accountability define the degree to which a student will attempt to change a teacher’s expectations. For instance, if a teacher expects a student to complete an academic task in class, the completion of that task will mainly stem on how clearly the instructions for the task are stated, how much risk is involved for the student by engaging in the task, and what means of accountability the teacher has placed upon the completion of the task. The first two components of these systems, ambiguity and risk have their own field of study (Jones, 1992; Silverman, 1996), but this review will focus on accountability mechanisms and their affect on student performance.
Siedentop & Tannehill (2000) adapted Doyle’s task systems and of inquiry to physical education, and from that knowledge base, the literature has produced an abundance of work that has given us strong insight on teaching in physical education and accountability. Work in this area has focused on everything from feedback (Lee, Keh, & Magill, 1993; van der Mars, 1987) to assessment (Tousignant & Siedentop, 1983; Zhu, 1997; Matanin & Tannehil, 1994) to monitoring (van der Mars, Vogler, Darst, Cusimano, 1994; 1998) to combinations and alternative methods of implementation (Hastie, 1994; Hastie & Saunders, 1992; Silverman, Kulina, & Krull, 1995; Crouch, Ward, & Patrick, 1997; Ward, Smith, Makasli, & Crouch, 1998) and finally, to use with diverse populations (Block, Lieberman & Connor-Kuntz, 1998). Important information is emerging from this field of work. With that in mind we must remember that for learning to take place in our classes, students must engage in the subject matter (Silverman, 1990).

For the purpose of this review, we must consider accountability as a part of a three-piece equation that defines task accomplishment. This equation, A-B-C, represents the three main components of determining or influencing behavior. (A) represents the antecedents, or the controllable actions of the individuals involved in trying to change the behavior of others, (B) represents the behavior itself, and (C) represents the consequences or results that are derived from the behavior. Both antecedents and consequences have affect on behavior. Examining both aspects may help us understand the differences.
In further establishing what accountability is, we can define it in two ways. First, there is the method of implementing some sort of contingency or reward mechanism in attempts to elicit a certain behavior. In the words of Doyle (1979), “rewards drive the task.” This method of accountability was the guideline for the earliest conducted research. Consequent studies modeled the work of Rushall and Pettinger (1969) who investigated the effect of a structured reward system on the training motivation of elite swimmers. This method of research produced findings that stated that rewards and contingency-based accountability was an effective method of producing desired behaviors, but only if the reward system was meaningful enough to the students.

Another perspective to defining accountability is through an eco-behavioral approach. An eco-behavioral approach considers methods of accountability from the other side of the task. Instead of placing a reward on the outcomes, eco-behavioral approaches concentrate on the antecedents, or primary stimuli, to maintain accountability (Greenwood, Delquardi, & Hall, 1984). This approach proved to be substantial, especially to the profession of teaching since learned teaching behaviors could be used to promote accountability.

Through the work of the researchers and educators mentioned, it has been identified that teacher behaviors, used as accountability measures, can have a positive effect on student performance of stated tasks. This is good news for teacher educators since we know that teaching behaviors can be taught, learned and implemented by our students (Siedentop, 1986).
Another area of concern for physical education teachers has been the development of accurate and easy to use assessment techniques. Recently, there has been a more concentrated look into the assessment practices of teachers and those who teach them about assessment (Veal & Taylor, 1995; Veal, Russell, & Brown, 1996). Educators have begun to implement new ways of assessing their students that rival the traditional test and re-test practices (Abendroth-Smith, Kras, & Strand, 1996; Block, Lieberman, & Connor-Kuntz, 1998; Hill & Miller, 1997; Lacy, 1995; Oslin, Mitchell, & Griffin, 1998; Schiemer, 1996; Schincariol & Radford, 1998).

Assessment has always been a tough subject for teachers to tackle. Traditionally, assessment in physical education has been directed at functions of compliance (i.e. dressing out, participation, attendance) and not on reflections of student learning (Lund, 1993). Even when performance is considered, it is done in ways that are suspect in recording true learning. Matanin and Tannehill (1994) suggest the use of on-going, daily assessment to obtain measures that reliably reflect student learning.

Siedentop and Tousignant (1984) define and describe two different categories of assessment in physical education; formal assessment, defined as assessment with the intent to affect grading procedures, and informal assessment, defined as assessment done to obtain knowledge about student performance but not for use in the determination of grades. The latter of these two is unfortunately the measure of choice for most physical educators. There is currently little formal
assessment in physical education that targets student performance (Lund, 1993; Matanan & Tannehil, 1994). Zhu (1997) stated that for assessment to be authentic, it must be performed in an on-going fashion within the setting where skills were intended to be performed.

Within the field of physical education, assessment is an area of varying difficulty. Classes are bigger than traditional classroom settings, the area covered is more expansive, and there is no permanent record (like a written example of work for an English class) of work completed for teachers to take home and thoroughly inspect. With these types of obstacles stacked against us, what is a physical educator to do that will allow them to produce a quality assessment routine for students?

Wood (1996) advocates the use of authentic assessment that is woven throughout the instruction process. This idea has many benefits for the practicing teacher. First, the assessment process becomes a part of normal routine and not something that is added on top of it so there is minimal work involved for the teacher to implement. Second, the results of this type of assessment provide teachers with hard evidence of a student’s performance when engaging in real subject matter. Being able to remove the subjective nature of grading in physical education would provide more credibility to our profession and allow for more accurate representation of human performance. Third, this type of assessment might prove to be an excellent mechanism for motivating students to perform better. If a student is performing and sees a teacher performing an assessment that
holds influence on that students formal grading procedure, chances are that student will want to perform at a higher level to warrant a good evaluation. This removes trying to motivate students all unit long and then watching them perform well only on "testing days." It has been shown that assessment and grade distribution has an effect on the performance of kids in class (Grehaigne & Godbout, 1998; Grehaigne, Godbout, & Bouthier, 1997; Kleinman, 1997; Matanin & Tannehill, 1994; Siegel, 1997).

As physical education moves into the new millenium, the idea of change is more apparent than ever. Since the early days of formal education, the argument over what to teach students has remained in debate. We have seen our little corner of this profession change over the years to include such curriculum as calisthenics, gymnastics, organized play, team sports, fitness training, and outdoor activities. With the changes eminent in society today, some physical educators (Corbin & Pangrazi, 1996) have begun to re-think the purpose of what we do.

The change that I am speaking of is developing a curriculum that recognizes the health of our students over their lifetime as the objective to which we are teaching. Physical education teachers generally accept the notion that physical activity is good for us in many aspects of our well being. However, we are just beginning to develop school-based physical education programs that encourage regular physical activity rather than physical fitness (Freedson & Rowland, 1992). To establish a rationale for this type of change, one needs to look no further than the recent Surgeon General’s Report on Physical Activity. In that report, the
Surgeon General points out that there is a prominent trend in sedentary living among American adults. The report also points out that by simply incorporating 30 minutes of moderate to vigorous activity a day to our lives we can reap the rewards of improved health benefits and quality of life (Corbin & Pangrazi, 1998; USDHHS, 1996). Until recently however, physical activity has not been addressed as a life-long behavior developed by our students rather than a state of movement performed for 45 minutes a day in our gymnasiums.

The first step in developing a new approach towards health-related physical education is distinguishing the definitions of important terms. Physical fitness, a term used in conjunction with physical education, is a term that is often used incorrectly as a substitute for physical activity. Physical fitness is a measure of the body’s capacity to perform physical activity (Pate et al., 1995). The mistake often made is confusing this for the actual performance of an activity. This is where our shift in thinking must originate. Physical fitness is simply a measure of the body’s capacity to perform physical activity. This altered and measurable state is affected slowly and is not easily changed. For these reasons, physical fitness must be questioned for its effectiveness as motivational and information data for our students.

Physical activity, on the other hand, is body movement produced by muscle that results in an increase in energy expenditure (Pate et al., 1995). Physical activity is the actual movement that we engage our students in on a daily basis. It is a changeable behavior that can be modified and measured on a daily basis, and is
as beneficial to the health and well being of our students as high levels of measured fitness.

Traditionally, the health aspects of physical education have been defined through fitness outcomes. This approach is now being questioned (Corbin & Pangrazi, 1998). Physical fitness is simply an outcome of being physically active. In realizing this notion, it becomes clear that the important portion of this equation is not the fitness itself, but rather the activity. For years, we have been promoting the outcomes instead of the process. An eco-behavioral view of this paradigm points out the fact that behavior is a function of the interaction with its antecedent (Greenwood, Delquadri, & Hall, 1984). By implementing this approach, we will not be stressing the outcomes or consequences of physical activity (fitness levels), but rather focusing on the antecedents of the formula, creating conditions that invites physical activity. There are a great many benefits to this idea. Let us examine these aspects carefully.

First, there is the concept of health. The whole reason behind engaging students into physical activity is that exercise is good for their health. However, we must begin to recognize that it is the activity itself, not the measure of fitness, that benefits their bodies. Physical activity positively affects many health conditions in both youths and adults. Some examples of these health condition benefits are improved cardiovascular endurance, flexibility, and muscular strength and endurance. Physical activity may also reduce obesity, alleviate depression and anxiety, and build bone mass density (CDC, 1997). It has even been suggested that
physical activity may affect the mental well being of those involved (Osness & Mulligan, 1998). These benefits are emerging in both youth and adults. When we begin to realize that the activity is what leads to healthy bodies, then we can begin to shift the focus of our teaching towards physical activity as a behavior rather than fitness as an outcome (Freedson & Rowland, 1992). The levels of fitness needed for individuals interested in training for athletic competition, likely lie well beyond those needed for reaching acceptable levels of health. Therefore, we need to encourage and monitor regular physical activity instead of placing an emphasis on physical fitness. (Corbin & Pangrazi, 1992; Gutin, Manos, & Strong, 1992). This is especially important since evidence is beginning to show that health-related fitness levels are not significantly improved by high intensity activities especially in younger children (Ernst, Pangrazi, & Corbin, 1998). Furthermore, because of physical activity's effects on health appear to have multiple mechanisms, some of which do not depend on fitness, a distinction is made between activity for health, and activity for fitness training purposes (Sallis, McKenzie & Alcaraz, 1993). The notion that many of the factors that influence high levels of fitness, such as genetic endowment, can not be influenced in the time provided by daily physical education classes must be realized by many in our profession. On the other hand, physical activity benefits all participants, positively impacts the health of children, and is a behavior that tracks from childhood into adulthood, suggesting that children who are active become more active adults (Ernst, Pangrazi, & Corbin, 1998).
It is this last factor that I would like to expand on further. It has already been stated that physical activity positively affects the health of children. This short term effect of physical activity is important because the health risk factor levels of children can predict the same risk factors in young adults. Therefore, it is important to engage children in daily physical activity. However, the scope of this method of health care goes much further. The notion that people become less active as they become older should not come as a surprise to many. Our lives begin to fill with other facets such as work, family, and countless other commitments. In fact, it has been reported that more than 60% of American adults are not regularly active and 25% of that population is not active at all (USDHHS, 1996). Along with this inactivity comes a higher risk of health problems and although the children of today are more active than we originally believed, this activity is not translating into their adult lives (Sallis & McKenzie, 1991). Physical education must begin to shift how it teaches students about being active. Again, the eco-behavioral approach would suggest that if students were presented with strategies that govern the behavior of physical activity rather than focus on the outcomes of it, we would be better served. If this becomes our approach, there would be a greater chance of the behavior staying with them throughout their lives. A few years ago, the guidelines for physical activity revolved around the notion of FIT (frequency, intensity, and time). This exercise prescription was derived by the American College of Sports Medicine (ACSM, 1976) for the purpose of guiding adults interested in becoming more fit. With no other model to go on, physical educators soon adapted these guidelines for
our physical education classes and began preaching this gospel to their students (Pangrazi, Corbin, & Welk, 1996). The first step in implementing a more accurate model is to realize that children are not small adults, and implement an appropriate activity model for them (Corbin & Pangrazi, 1998). Children are not abstract thinkers and need concrete evidence to continue to perform activity. They cannot accurately distinguish between effort and ability and rely more heavily on parents and peers for their values and beliefs (Welk, 1999). They have unique physical, social, and cognitive traits that influence their participation in physical activity. If we begin to realize that children are unique in their activity patterns, we begin to understand that most children are not inactive, but that they are active in different ways from adults (Pangrazi, Corbin, & Welk, 1996). Instead of focusing children on being active for a short period of time at a high intensity, we should focus them on accumulating moderate to vigorous levels of activity over the course of the day.

New guidelines recommend that children should accumulate 30 to 60 minutes of activity, but have the course of the entire day to do it in (Corbin & Pangrazi, 1998). Using the entire day involves using time other than physical education classes to keep our students healthy. Accumulation is the key, and the emphasis shifts to teaching children how to use their day for the accumulation of activity. Teaching them different types of activity and different ways that they can accumulate it becomes the focus of how and what we teach our children.

Another component of this paradigm is the fact that children who involve themselves in high-intensity exercise may become burned out and disinterested
Active children habitually engage in a variety of activities and yet as they mature, become disinterested in many of them (Sallis, McKenzie, & Alcaraz, 1993). If this is true, we may actually be turning kids away from being active. There is evidence to suggest that kids are already the most active section of our society, so if as adults they avoid activity, K-12 physical education specialists probably have contributed to this behavior (Corbin & Pangrazi, 1992). Some ways to help our students remain active throughout the day and throughout their lives is help them understand new ways of achieving activity. Daily activities such as walking, washing cars, riding bikes, and climbing stairs are a great way to accumulate activity. Short bouts of activity that last 5 - 10 minutes serve the health of participants as well as lengthy bouts of high intensity exercise (Corbin & Pangrazi, 1996). Teaching this concept requires an understanding of the old adage, “give a man a fish he eats for a day, teach a man to fish and he eats for a lifetime.” If we give kids physical activity, they will be active for our class, if we teach them to voluntarily and independently engage in physical activity, they are more likely to be active for a lifetime.

An increase in children’s participation in moderate to vigorous physical activity is a recognized health goal, and, therefore, every avenue needs to be opened to reach this goal (Simons-Morton et al., 1990). This type of approach to teaching kids to develop strategies about physical activity has been shown successful. Written agreements, behavior contracts, and decision making, have
been associated with a 10% to 25% increase in the frequency of physical activity (O'Connor, 1994; Rosengard & McKenzie, 1994).

Simply plugging in a new model of physical activity is simply not enough to get our students to accumulate the physical activity they need. There are a great many obstacles that we must take into consideration. First, studies tell us that gender, age, and cultural and individual differences all play a part in a student’s participation in physical activity (Sarkin, McKenzie, & Sallis, 1997; Welk, 1999; CDC, 1997). For example, there is a great deal of difference between the social pressure placed upon boys to become involved with activity based pursuits (mostly athletics) than there is with young girls. These factors coupled with the access to equipment, parks, and programs and biological factors such as physical skills, fitness, and body fat also influence participation (Biddle & Goudas, 1996). Overall however, the main influence on a child’s participation in activity is their socialization into it. Parental, peer, and significant other’s influences will drive the desire to participate in physical activity (Welk, 1999). This has great implications for physical educators since physical education has been identified as an optimal vehicle for influencing physical activity habits among youth (Welk, 1999).

Numerous studies have also pointed out that children of active parents become more active themselves (Brustad, 1996; Dempsey, Kimiecik & Horn, 1993), and that the modeling of physical activity is more important than the introduction of knowledge.

Another obstacle in adapting physical activity as the focus of our classes is
the measurement and evaluation of our students and their engagement in that activity. If we are to shift our thinking away from the traditional fitness methods, our current assessment practices must also be revised. Using fitness test scores to rate or compare students is no longer appropriate for what we are trying to achieve. Instead, fitness scores are to be solely as a ruler to identify how much activity a student is capable of performing at that particular time. Because our focus is expanding across the life span, we can no longer think of fitness results as a product. We must recognize them as a reference of the students’ potential at that particular time. It needs to be addressed that activity is and will be difficult to assess because activity levels are continuously fluctuating. As students mature, their physical, social, and mental capacities all affect their ability to involve themselves in physical activity (Malina, 1996).

In addition, it has been noted that less than 20% of the variation that occurs in children’s physical activity levels is stable over time. This alone should tell us that our assessment of students must extend beyond a single performance on fitness tests (Sallis, Berry, Broyles, McKenzie, & Nader, 1995). Children’s activity levels are primarily influenced by variables that are constantly changing, rather than variables that are consistent in their day-to-day lives. However, not all is lost. The notion of tracking students’ physical activity over time is not beyond the realm of our current educational system. This technique is common in many other subject matter areas. Tracking, or stability of a characteristic, refers to the maintenance of relative rank or position within a group over time, and longitudinal observations of
the same individual on at least two points are needed (Malina, 1996). The measurement of physical activity is complicated because of the variability of the behaviors that together make up physical activity and because it is known that numerous biological, psychological, social, cultural, and physical environmental factors influence it. The good news is that there are promising methods in place to assist us (Sallis, et al., 1995). The use of on-going, in-class assessment, activity logs, and self-reporting are all effective ways for students to begin to assess their involvement in physical activity. Different methods of systematic observation are effective for determining physical activity levels in students. These systems can range from very complex to very simple. These methods are not designed for the distribution of grades, but rather assessment of students’ potential to reach health related goals. In addition, the fitness tests that we currently administer can be a helpful tool if used correctly. If the tests measure components of health related fitness (cardiovascular endurance, muscular strength & endurance, flexibility, and body composition) not skill related fitness (agility, power, speed, and coordination), and if the results of these tests are used to compare performance to a standard of health instead of a comparison to others’ performances, then these tools may be of great use to teachers (Freedson & Rowland, 1992).

Once the obstacles in our students’ lives are identified, we can then begin to focus on the strategies to increase their physical activity levels. One effective way to increase physical activity in children is to provide quality, daily, physical
education (CDC, 1997; Summerfield, 1998). Rosengard and McKenzie (1994) have provided us with a strong guideline to follow for implementing this change.

To increase the opportunity for our students a teacher must first increase the amount of time during physical education classes devoted to students being active. By reducing waiting time and increasing activity time, teachers can begin to realize how active students in classes can be. No longer would the lesson determine the amount of physical activity accumulated, but rather the willingness of the student to engage in activity would be the crucial factor. Once this is achieved, teachers can then be made aware of a student’s true activity involvement.

Simple methods of systematic observation can be implemented to achieve this awareness. Using a stopwatch and timing one student’s activity throughout a lesson can provide us with information about how active students are in class. The next component of promoting physical activity is to implement a fun and enjoyable curriculum in which students can participate. The main goal of a health related physical education curriculum should be to prepare children and adolescents for a lifetime of activity. Although this may not be a new goal for physical education, reaching it effectively will require the implementation of both curricular and instructional strategies substantially different from the sport-oriented and traditional fitness programs that currently exist (McKenzie & Sallis, 1996). It is important for teachers to realize that we can not simply “make” our students become more active. Referring back to this discussion about change, the first thing required for change is a desire to change. Proven and effective curriculum guides
for physical activity and health concept promotion that motivates students to become involved must be developed. Too many times teachers have plugged in a radio and had their students run laps and thought they were promoting physical activity. The curriculum that you choose and then develop for your needs will not only allow for more activity in class but will also foster the students’ desires to want to participate. This step may take time, but it is crucial to the development of the ideas proposed in this address. There are strong examples of effective in-serviceing techniques that have proven to be positive on the effectiveness of teachers in regards to developing physical activity with their students (McKenzie, Sallis, Faucette, Roby, & Kolody, 1993).

The last major component to promoting physical activity for your students is to promote activity outside of the classroom setting. To me, this is the greatest untapped resource at our disposal. We all know of the great limitations in adding more to our already full classes, so the next most reasonable response would be to encourage kids to fill their free time with physical activity. One area found to be of great importance to the value of children is the influence of parents and significant members of their lives. This is being shown true with physical activity (Biddle & Goudas, 1996). The way that students spend their time outside of school is usually determined by a parent or significant role model. If a teacher would make portions of a curriculum include these outside influences, then a great majority of a student’s time could be affected. If our true goal in physical education is to focus on the health and well-being of our students, than this aspect is not an extra burden
worthy only of investigation when time permits, it is an essential portion of
developing activity behaviors that will be reinforced for a lifetime. Along with the
above-mentioned methods of promoting physical activity, there are numerous other
agencies and individuals who have developed multiple facets of defining,
promoting, and implementing strong examples of physical activity programs (CDC,

Teaching is hard work. We have to begin to recognize the fact that for
effective instruction to take place, work must be performed. If done correctly, the
education of teachers can develop the skills that will allow such work to exist.
However, if we fail to realize that physical education must evolve from some of its
current practices, we will be left standing on an empty field wondering where
everyone went when it is all taken away from us.