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# The Relationship Between Instructional Alignment and the Ecology of Physical Education

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The purpose of the study was to examine the ecologies of two teachers and the extent that each teacher's agenda aligned with instructional activities and assessments for each unit of instruction. Data were collected in four ways: (1) videotaped record of each lesson, (2) live observation field notes and expanded field notes from the videotape, (3) formal and informal interviews, and (4) document data. Field note data were analyzed inductively and excerpted into meaningful units that demonstrated aspects of the classroom ecology and instructional alignment. Interview data were analyzed qualitatively through constant comparison. Results indicated that the teachers had differing agendas for the units of instruction. The differences in their agendas resulted in different classroom ecologies and a weakened program of action. The teachers shifted their espoused agendas (focus on student learning) to an enacted agenda that focused on safety and completing tasks. As a result of this shift, the focus of each teacher's agenda was not assessed in the manner that they had espoused. Consequently, there was no instructional alignment between the teachers' espoused agenda, lesson tasks, and assessments.

**Keywords:** program of action, instructional alignment, ecology

Physical educators are concerned about a variety of instructional and managerial issues when teaching, such as the clarity of their instruction, student behavior, management of students and equipment, and student learning. Historically, student learning has not been a major focus in physical education, but recently student learning has become more important as a result of an emphasis on assessment and accountability. In physical education, the emphasis has been on alternative assessment, which is defined as a variety of tasks and settings in which students

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are given opportunities to demonstrate their knowledge, skill understanding, and application of content in a context that allows continued learning and growth (Lund & Tannehill, 2005).

Alternative assessments strengthen instruction when they are aligned with teachers' planned instructional activities and their learning objectives, or what they intend for students to learn over the course of a lesson or unit of instruction. Teachers that plan and deliver their instruction in this manner are able to create instructional alignment within their lessons and units of instruction. Instructional alignment describes the extent to which stimulus conditions match among intended outcomes, instructional processes, and instructional assessment (Cohen, 1987). Instructional alignment is significant because evidence indicates that well-aligned instruction produces achievement results that are two to three times stronger than nonaligned instruction (Cohen, 1987).

It is important to note that instruction can be misaligned, and, consequently, student learning may diminish. Research results have indicated that physical education teachers often do not plan for or systematically implement assessment into instructional lessons (Kneer, 1986; Lund, 1993). As a result, the lack of assessment in instructional lessons creates a misalignment. In fact, when teachers omit any one of the three components (learning objectives, learning tasks, and/or assessments), this may result in a misalignment of their instruction.

Instructional alignment has been investigated in general education research (Fahey, 1986; Koczor, 1984; Tallarico, 1984) and has been explored in a limited fashion in physical education (Ward, 1999). In one investigation of instructional alignment, Koczor (1984) delivered six lessons teaching fourth graders to write Arabic numerals for designated Roman numerals. Throughout instruction, the Arabic numeral was always written after the Roman numeral. Immediately after instruction, students received a posttest. One group of students received a posttest that was aligned in a manner that the Arabic numeral was always written after the Roman numeral. A second group of students received a posttest in which they had to write the Roman numeral after the Arabic numeral, which created a misalignment. The misalignment of the second group's test accounted for a 40% difference in posttest raw scores that favored the aligned posttest.

Instructional alignment has been examined to some extent in physical education, particularly in the Saber Tooth Project. Results from the Saber Tooth Project suggested that instructional alignment might have an effect on academic work in physical education (Ward, 1999). Evans et al. (1999) found that the teaching-learning process was enhanced when teachers used instructional and assessment strategies that ensured that articulated broad learning outcomes, such as social skill development and the development of tactical game play, were met.

Instructional alignment is created through systematically planning and implementing instruction that focuses on aligning assessments and instructional content with what the teacher intends students to learn (learning objectives). Instructional content and assessments become learning tasks that are situated within the instructional task system. The instructional task system is one of three subsystems that make up the ecology of physical education. Such an ecology provides a framework for understanding what happens in a physical education classroom. This framework takes into account the fact that what teachers do in a classroom influences students and conversely what students do also influences their teachers. Ecologies consist of

several systems that interact with each other—the actions of one system influence the actions of others within the ecology (Doyle, 1986).

In addition to the instructional task system, two other task systems, managerial and student social system interact to create the ecology in physical education classrooms (Hastie & Siedentop, 1999; Siedentop & Tannehill, 2000). As expressed previously, the instructional task system is related to the content that is being taught. Examples of instructional tasks would be movement activities, activities that focus on tactical understanding, and assessment tasks that allow students to effectively participate in games, gymnastics, and dance activities.

The managerial task system includes tasks that relate to the behavioral and organizational aspects of physical education, the non-subject-matter functions that are imperative if learning is to be accomplished over time. The managerial task system includes both the actual management of materials and space along with the establishment and maintenance of appropriate behavior (Doyle, 1986; Siedentop, 1988). Examples of managerial tasks include establishing rules for appropriate behavior and safety, selecting teams, picking up and returning equipment, and transitioning from one activity to another.

Although the managerial and instructional task systems are largely teacher directed, the student social system is primarily arranged and directed by students who clearly have a social agenda when they come to physical education (Allen, 1986; Carlson & Hastie, 1997; Jones, 1992). This agenda in physical education might include talking with a friend while taking part in a movement activity (i.e., chatting while performing a basketball drill) or moving completely away from a given task to discuss the upcoming school dance.

The three task systems interact to create a program of action. The program of action is embedded in activities teachers and students enact together as they accomplish academic work. It has a specific direction and momentum, which determines appropriate behaviors for students during instruction. In essence, the program of action draws events and participants in the classroom toward the completion of specific tasks (Doyle, 1986).

The program of action is a dynamic vector that encompasses instruction, order, the agenda a teacher has for the lesson, and appropriate student response and interactions necessary for the vector to maintain momentum and direction. This vector can best be described as the place where what the students and a teacher do in a classroom interacts and moves the class along in the direction of learning. The vector is dynamic in the sense that there is momentum and energy generated by the teacher's and students' actions that can combine in positive ways that maximize the learning vector or sometimes in negative ways that minimize the learning vector. Students often initiate secondary vectors that are created through social tasks that are influenced by students' agendas. Students' agendas generally have two goals: (a) to socialize and have fun and (b) to achieve a passing grade while performing a minimal amount of work (Allen, 1986). Students initiate secondary vectors to influence the program of action and to test the strength of the program of action, as well as to reveal possible openings for their personal agendas. In addition to defining the predictability of the social system of the class through secondary vectors, students can also estimate the stringency of the academic accountability in the class (Doyle, 1986).

Student social tasks that create the secondary vectors are not announced publicly and then pursued; nonetheless, these tasks are communicated among students in subtle ways that may result in student social tasks interacting with other task systems in a manner that may weaken the program of action. For example, student social tasks such as talking may disrupt the instructional task system, which could weaken the program of action. Although it is possible for the student social system to weaken the program of action, it is also possible that it can support the other task systems and strengthen the program of action (Carlson & Hastie, 1997; Hastie, 2000).

Although different aspects of the ecological framework have been investigated, such as trade offs between order and reduced instructional task demands (Jones, 1992) and the student social system in physical education (Carlson & Hastie, 1997; Hastie & Pickwell, 1996), research is lacking in regard to how the ecology of physical education is influenced by instructional alignment and vice versa. Specifically, how does what happens in each of the three task systems influence teachers' agendas for a unit of instruction and what effect do these agendas have on instructional alignment? The importance of this research is punctuated by the fact that instruction that is aligned and systematically implemented in a fashion that preserves that alignment results in increased student learning. With this in mind, it makes sense for teachers to focus their efforts on providing explicit instruction that provides learning tasks (content) and assessments that are aligned with what they intend for students to learn (learning objectives). Thus, the purpose of the study was to examine the ecologies of two teachers and the extent each teacher's agenda aligned with instructional activities and assessments for each unit of instruction.

## Methods

### Setting and Participants

The study was conducted in a suburban elementary school located in western Massachusetts. The physical education teachers at the elementary school and their district colleagues had made an effort to match their curriculum with the Massachusetts Comprehensive Health Curriculum Framework (1999), which includes physical education, health, and consumer studies. Through this curricular revision process, the teachers not only emphasized learning goals and learning tasks, but also focused on assessment. This was important in site selection because to study instructional alignment, assessment had to be included in the physical education program being studied.

**Far Elementary School.** Far Elementary School housed 496 students ranging from pre-K to fourth grade. Students in the elementary school were similar in both social class (upper class) and ethnicity (Caucasian).

Entry to the site included gaining district approval from the superintendent as well as 100% consent to participate from teachers, students, and their parents. All participants signed written consent that explained the study in detail. In addition, participants were informed in this document that pseudonyms were to be used throughout this article to protect their anonymity.

Far Elementary School participants included an intact class of 24 fourth-grade students (12 females; 12 males) and their teachers, Ms. Adventure (21 years of experience) and Mr. Fit (12 years of experience). The fourth-grade students had physical education with the physical education specialists for 40 min every Monday and Wednesday. The physical education teaching schedule consisted of the teachers alternating days of instruction with the fourth-grade students in each unit of instruction. On Mondays, Ms. Adventure taught the students and Mr. Fit taught on Wednesday. While one teacher taught, the other teacher was absent from the gymnasium and worked in their office. Although the teachers taught each unit on alternate days, they still planned together so that the content remained constant even though the teachers alternated days teaching. The alternate day teaching schedule was an administrative decision and was not done for the purpose of the study.

## Data Collection

As a nonparticipant observer (LeCompte & Preissle, 1993), the primary researcher observed the fourth-grade class at Far Elementary School 25 times over a 4-month period. Data were collected in four ways: (1) videotaped record of each lesson, (2) live observation field notes and expanded field notes from the videotape, (3) formal and informal interviews, and (4) documents such as assessments, task cards, and district curricula.

Data collection began with an observation period in which rapport was developed with the teachers and students through informal discussions. The goal of this observation period was to allow the researcher to become part of the fabric of the class (i.e., unobtrusive), which would reduce researcher influence on the teachers and students.

Observations were conducted during two units of instruction. The fitness unit was six lessons long and consisted of instruction about aspects of health-related fitness and the Fitnessgram tests. In addition, other fitness activities such as monitoring and graphing heart rate responses to exercise were also included. The obstacle and challenge unit (O & C) was eight lessons long and consisted of individual and group challenge activities, such as the mat wall and island escape. Observations were conducted for 40 min twice a week for a total of 80 min per week.

**Field Notes and Observations.** Field notes, used to gather data specifically on instructional alignment and the ecology of the classroom, were written during and immediately after each observation. Descriptive notes from observations focused on events that occurred in the gymnasium, particularly in regard to the ecology and the role instructional alignment played in that ecology.

Each lesson was videotaped to obtain a visual record of the lesson to support the field notes and to provide an accurate record of the classroom events. In each videotaped lesson, the teacher wore a wireless microphone to enhance vocal clarity. Audio portions of the recorded videotapes were transcribed and used to support field notes taken during live observations.

**Interviews.** Both physical education teachers participated in an interview conducted before each unit was taught (preunit interview) and an interview that was conducted after each unit was taught (postunit interview). In all, there were four

interviews; one pre- and postunit interview for the fitness unit and one pre- and postunit interview for the O & C unit. All interviews followed a semistructured interview guide. The preunit interview questions with the teachers focused on how they planned for each unit, including learning objectives, learning tasks (content), and assessments. Examples of questions that were asked of the teachers in the preunit interview included

What are your learning goals for the unit?

What learning tasks are planned for the unit?

What assessment activities are planned for the unit?

Information gleaned from the preunit interview was essential because it was the only data source that provided information about the teachers' goals, learning activities, and assessments because they did not write out detailed lesson plans. The postunit interview questions examined both teachers' perceptions of the extent to which they achieved their learning objectives and how the assessments aligned with their learning objectives and tasks. In addition, questions focused on the extent students met their learning objectives for each unit of instruction. Examples of questions teachers were asked in the post unit interview included

Describe how your assessments in the unit reflected your instructional goals for the unit.

Describe how and to what extent your students met your learning goals for the unit.

Interviews lasted 30–45 min; in addition, all interviews were tape-recorded and transcribed verbatim. In addition to the formal interviews, informal interviews, which occurred between the teachers and the researcher, were recorded promptly after the conversation had taken place. These interviews usually focused on assessment and were useful for clarification of researcher questions.

Thirteen students (6 girls, 7 boys) participated in two formal semistructured interviews. Students' preunit interviews (10–15 min) focused on their perceptions of the physical education activities in which they participated and their knowledge of what assessment was and how their teachers assessed them in physical education. Examples of questions that students were asked in the preunit interview included

What are your favorite activities that you participate in during physical education?

What is assessment in physical education?

What types of things does your physical education teacher do when they assess you?

The postunit interview questions (20–25 min) focused on students' perceptions of what they learned in the unit and their perceptions of the assessments that were used in each unit. Both the pre- and postunit interviews with students were tape-recorded and transcribed verbatim. Examples of questions in the postunit interview included:

Describe to me what you learned in the unit.

Describe to me how your teachers assessed you in the unit.

How did the activities and assessments help you to learn what you did?

What do you like most about the assessments that were done in the unit?

**Document Data.** Document data in the form of sample assessments, task cards, and district curricula were collected. These data were used to support field note observations of both units of instruction.

## Data Analysis

Data analysis was ongoing throughout the data collection process (Merriam, 2001). All field notes were typewritten and inductively analyzed using Doyle's (1979) ecological model and Cohen's (1987) model of instructional alignment. In addition, the researcher remained open to new categories and ideas.

For field note data analysis, the researcher responded to either verbal or nonverbal cues, such as specific assessments and learning activities presented to students. Specific aspects of the classroom ecology, such as the three task systems, how order was created and maintained, and accountability, were noted. Data were analyzed in regard to each teacher's ecology and instructional alignment to account for the turn teaching arrangement between the teachers. From this analysis the field notes were then excerpted into meaningful units that demonstrated aspects of the classroom ecology and instructional alignment. These units were then categorized into each characteristic of the ecology and instructional alignment and then placed into charts as intermediate data products. Categories were developed from examining these intermediate data products for common elements that ran throughout and tied them together. Themes were then extracted from these categories (Neuman, 1994).

Interview data were analyzed qualitatively through constant comparison (Miles & Huberman, 1994; Strauss & Corbin, 1998) using the Ethnograph Version 5.0 to organize and manage the data. Data were coded using open, axial, and selective procedures to develop categories. Category development was documented through the use of a documentational table (Constas, 1992). Categories were examined for common elements that ran throughout and tied them together. Themes were then extracted from these categories. Data were then selectively coded for examples that illustrated the themes (Neuman, 1994).

**Data Trustworthiness.** Data trustworthiness was established in three ways. First, triangulation was ensured through field note observations, interviews, and document data. Secondly, member checks were conducted in which each teacher received interview transcripts and had the opportunity to discuss any aspect with the primary researcher to clarify or add emphasis to any point they had made. Finally, particular care was taken to search the data for negative cases that could serve to disprove an emerging category or theme or to provide an alternative perspective (Merriam, 2001).

## Results

Data from this study were analyzed from an ecological perspective. To provide a picture of the ecology, excerpts from holistic field notes are provided to help describe the ecologies of each teacher, as well as further delineate the alignment



among teachers' agendas, instructional tasks, and assessments used in each unit of instruction. Results are presented in three broad categories: (1) classroom ecologies of each teacher, (2) teachers' agendas, and (3) teachers' enacted agendas, activities and assessments.

## Classroom Ecologies

***Ms. Adventure's Classroom Ecology in the O & C Unit.*** Ms. Adventure's classroom ecology in the O & C unit was characterized as businesslike. All tasks were presented in a manner that communicated expectations for students to work hard and stay focused on completing each task. She presented instructional tasks that focused on learning about working together in the O & C unit. Field notes indicated that she frequently gave instructional feedback to students and served as a facilitator of instruction by asking questions and soliciting ideas, rather than directly instructing students how to work together to solve the challenge tasks in the O & C unit. For example, on Day 3, field notes indicated that one group was having a great deal of difficulty at the island escape task. All but one of the team members had made it across the gym and the other teammates were struggling to help him. Ms. Adventure said to the group, "Okay come on you guys, you only have Josh that needs to get across." Josh's teammates told him to scoot on the scooter, but this proved to be difficult. His teammates yelled, "Use the rope!" Ms. Adventure replied, "But the rope has to be left there too. Figure it out. Figure out how to get him here and leave the island where it belongs." The teammates on shore pushed a scooter with a cone on top of it to Josh. Josh sat on the scooter and started to use the cone as a paddle. Ms. Adventure responded, "Oh, you have to leave the cone. So how can you get here?" His teammates yelled, "Take the rope!" Ms. Adventure replied, "No, you just can't throw it back. The students shouted, "Give yourself a push off the island and try to scoot to shore." Josh almost made it to shore and his teammates yelled, "Josh, Josh, take my hand, Josh!" Josh reached out his hand to his teammates and they pulled him to shore.

Ms. Adventure's managerial tasks were explicitly expressed and students were held accountable for performing the tasks correctly. In the O & C unit, the majority of the managerial tasks centered around grouping students for each challenge. Typically, Ms. Adventure told the students how many people were to be in a group and gave them a specific amount of time to form groups. Once the groups were formed, they stayed together for the entire class period. The only managerial tasks involving transitions were when the groups rotated to a new challenge station. Students reset the equipment at each station and moved quickly to the next station. Because the equipment was set up in advance, there were no managerial tasks that involved moving equipment.

For the most part, student interactions between Ms. Adventure and her students were about the learning tasks. Often students asked questions to try to negotiate the task demands of a challenge and Ms. Adventure did not allow these negotiations to influence the task boundaries that were set by the rules and consequences written on each task card that described each challenge station. For example, field notes indicated that students attempted to verbally negotiate a task in which a large Omnikin ball had to be moved from one base to another without the group using their hands. Ms. Adventure explained the challenge and informed the students they

could not use their hands to move the ball and the ball could not touch the floor as it was being moved. A student replied, "You can give it a big kick." Ms. Adventure responded, "You are not allowed to kick it, the ball cannot touch the floor so kicking it will not help, bouncing it will not help." The students asked, "How do you do it?" Ms. Adventure replied, "You got to figure it out and everybody has to be involved. So your group has to figure out how they can carry the ball over to the other side."

Field notes also indicated several instances where students did not follow the consequences on the task cards and modified the tasks to be successful in the O & C unit. For instance, field notes indicated on Day 2 that a group of students were at a challenge called *Cross the Grand Canyon*. In this challenge all group members had to cross the "Grand Canyon" by swinging across on a rope and landing on a square mat. If any member touched the floor of the canyon, one teammate who had already made it across had to go back with the person who touched the canyon (document data). One group was having a great deal of difficulty crossing the canyon and many group members touched the canyon floor; however, they did not follow the rules and consequences of the challenge. Ms. Adventure saw this and responded, "You can't just run around the Grand Canyon. One person and someone else has to go back." Field notes indicated that only one boy went back, not the two as required by the consequences on the task card.

**Ms. Adventure's Ecology of the Fitness Unit.** Ms. Adventure's class climate in the fitness unit was very similar to the climate in the O & C unit. Field notes indicated that there was a great deal of instruction about fitness concepts. Ms. Adventure used a variety of instructional tasks such as Fitnessgram tests, taking heart rates, question and answer, peer assessment, and graphing to move her enacted agenda forward. Ms. Adventure's instructional tasks were described in detail and she used a variety of informal accountability techniques, such as monitoring and active supervision, to hold students accountable for completing the instructional tasks. For example, Day 2 field notes indicated that Ms. Adventure's lesson focused on cardiovascular endurance. She asked a series of questions about which exercises promoted cardiovascular endurance. In addition, she taught the students how to take their heart rate. As the lesson progressed, the students engaged in a series of physical tasks that were progressively more strenuous. After each exercise segment, the students recorded their heart rate on a worksheet. Throughout the lesson, Ms. Adventure monitored students from the perimeter and gave feedback to students while watching to ensure they implemented the feedback. In the latter part of the lesson, Ms. Adventure led the students through a worksheet in which they graphed their heart rate response to the exercise bouts. When students completed their graphs, Ms. Adventure asked, "What happens to your line?" A student replied, "Mine goes all the way up." Ms. Adventure asked, "Why do you think that was?" The student replied, "It went up because we exercised." Ms. Adventure then replied, "Some of you may not see a big jump in your graph. You may only see little jumps. Why is that? A student responded, "It depends on how hard you go."

Ms. Adventure's managerial task system comprised a set of routines. The routines included students entering the gym and sitting together, after which Ms. Adventure introduced the lesson and continued on with instruction. In the fitness unit, Ms. Adventure had several managerial tasks that involved passing out worksheets

for students to record heart rates and fitness goals. Ms. Adventure passed these out to each student, which often took some time and resulted in several students going off task. In addition, there were several transition tasks that involved equipment in the fitness unit. For the most part, these transitions were quick and efficient. Ms. Adventure always enlisted her students in helping to collect and disperse equipment during these transitions, which resulted in little wasted time.

Although Ms. Adventure's espoused agenda was to further the students' understanding of health-related fitness concepts, her enacted agenda was heavily influenced by her attempts to maintain order, prevent off-task behavior, and complete her planned instructional tasks by the end of each lesson. Field notes indicated that Ms. Adventure was determined to complete her planned instructional tasks, even at the expense of not providing instruction that enabled students to make connections between the tasks and health-related fitness. For example, on Day 6 of the fitness unit, students were being tested with the push-up test. Ms. Adventure demonstrated the test, but failed to provide any explanation of how the test correlated with health-related fitness. There were several students who were running and not preparing to take the test. Ms. Adventure said, "Boys, you need to be in one spot." Ms. Adventure exclaimed, "Boys, come over here. You're wasting time." The boys began to do their push-up test; however, they began to interfere with their partners and other groups. Ms. Adventure remarked, "If you are not doing push-ups do not lie under your partner or interfere with your neighbors." Although these students were off task, Ms. Adventure pursued her agenda to finish the test, without any instruction about how the test was connected to health-related fitness.

Examples of student social tasks ranged from students modifying fitness test items to make them physically less difficult to students going completely off task. Field notes from Day 6 provide an example of how students physically modified fitness test items to make the tests less difficult. While students were taking the push-up test, they tried hard to keep their back straight when Ms. Adventure was near; however, many of them let their backs dip and did not maintain straight lines when Ms. Adventure was not in close proximity.

In addition, there were several instances of students going completely off task. For example, on Day 6 of the fitness unit, the students were warming up by playing a fitnopoly game (similar to monopoly, but instead of buying properties, students do exercises) that required students to roll big fuzzy dice. While some of the students were playing the game, others were shooting the dice at the basketball hoop, and others just lay on the floor talking.

***Mr. Fit's Classroom Ecology in the O & C Unit.*** Mr. Fit's classroom ecology could be best portrayed as a casual ecology with loose accountability that lacked instructional intensity. In addition, Mr. Fit's ecology was characterized by playful banter between the students and him. Field notes on Day 5 provide an example of this banter. Mr. Fit was instructing students about the importance of not crossing in front of other students while doing the challenges. A student raised his hand after Mr. Fit told the students not to cross in front of others and stated, "So you don't want to cross in front of any stations?" Mr. Fit laughed and exclaimed, "Whoo Hoo. What did you eat for breakfast? Koo Koo Nuts? After this comment, all the students laughed and Mr. Fit continued with the lesson.

Field notes further indicated in the O & C unit that Mr. Fit offered very little systematic instruction. As a result, any student learning regarding working together was incidental rather than the result of methodical instruction. Mr. Fit's instructional feedback in the O & C unit focused on the students acting in a safe manner and following the rules and consequences of each challenge that were outlined on task cards at each challenge station. For example, on Day 5, field notes indicated that the students were participating in a challenge called *ship to shore*. The students had to solve the problem of traveling from their stranded ship in the middle of the gymnasium to the shore on the other side. The students had to get all group members from their ship to the shore using only a rope and a scooter. If a group member touched the floor, they and another person had to go back to the ship and start over (document data). One boy and a girl touched the floor. Upon seeing the students touch the floor, Mr. Fit responded, "Jenna and Jon, go back to the start. Read the rules." Another student stepped on the floor and the students did not go back. Mr. Fit replied, "Now, what should have happened? Mark is going back and Amy is going back. If a rule is broken, the person who broke the rule plus one other person must go back. She touched and you touched. You have to go back." These examples are typical of the type of instruction provided by Mr. Fit in the O & C Unit. There are no examples in field notes of instances where Mr. Fit engaged in any facilitative behavior that would enhance his instruction and help his students work together or think of different and creative ways to solve the challenges.

Mr. Fit's managerial task system revolved around keeping students busy and following classroom rules and procedures. Mr. Fit tolerated a great deal of off-task behavior; however, he always stopped off-task behavior if it could lead to a safety issue. Although Mr. Fit intervened against off-task behavior that was unsafe, there were several instances where Mr. Fit simply ignored or did not see students engaging in off-task behavior. Most of Mr. Fit's managerial tasks in the O & C unit focused on grouping students. His managerial tasks to group students were not very explicit. For example, on Day 5 of the O & C unit he replied, "I want to have a mixture of boys and girls in a group. I don't care if it is one boy or one girl, but it has to be a mixture." The students struggled to group themselves because they did not know how many people should be in a group. Mr. Fit observed this and remarked, "You should have about eight in a group." A group of students replied, "We have nine." Mr. Fit said, "You have nine, yes you do. Somebody can come here. Actually I am going to have two of you come over here. No, we need boys, two boys." Often a great deal of time was spent on managerial tasks as a result of the lack of explicitness of the managerial tasks given by Mr. Fit.

Student social tasks were abundant in the O & C unit during Mr. Fit's class. Field notes indicated that students often physically negotiated the rules and consequences of O & C tasks. An example of this negotiation occurred on Day 5 of the unit. Field notes indicated that a group of students were at a challenge named *island escape*. The challenge was for students to travel from island to island until all group members made it across the gym. If a person touched the gym floor, the consequence was that the person who touched the floor and the person who had advanced the farthest had to return to the beginning (document data). One group was using a rope to pull team members from island to island; however, a boy fell off and the group member who had advanced the farthest did not go back with

him. There were several instances that were similar to this. Often Mr. Fit did catch students not following the consequences of the challenge and held them accountable to follow the consequences according to the challenge. The students, however, were very skilled at determining whether Mr. Fit was watching their group and, if he was not, they often did not follow any of the consequences for breaking the rules of the challenges.

**Mr. Fit's Ecology of the Fitness Unit.** The climate of Mr. Fit's fitness unit was much less businesslike than that of Ms. Adventure, although field notes indicated that he used instructional tasks that were similar to those of Ms. Adventure in the fitness unit. Mr. Fit used question and answer sessions and Fitnessgram tests as instructional tasks in the fitness unit. Field notes from Day 3 indicated that he asked a series of questions about muscular strength and endurance. Mr. Fit asked the students, "What is the difference between muscular strength and muscular endurance?" A student replied, "Muscular endurance is when you use your muscles for a long time." Mr. Fit then asked, "What if you are a power lifter and you lift the barbell with the most weight you could possibly lift one time, what would that be? John replied, "Muscular strength." Mr. Fit responded, "Why?" John answered, "Because you have to lift the weight." Mr. Fit replied, "I know but why wouldn't it be muscular endurance?" Jill replied, "Because you are only doing it one time."

Mr. Fit's managerial task system in the fitness unit was less rigorous than Ms. Adventure's managerial task system. He often stated managerial tasks that were ambiguous and seldom applied strict accountability to the managerial tasks, which in turn often led to students being off task. In addition, field notes indicated that he often engaged in casual conversation and bantered with students. For example, on Day 3 of the fitness unit, field notes indicated that he carried on a conversation with a student about a wedding that they had both attended while she was supposed to be working on fitness test items.

The student social tasks in Mr. Fit's fitness lessons often consisted of students engaging in off-task behaviors such as talking and modifying the fitness testing tasks. For example, field notes indicated on Day 4 the students were supposed to be performing the trunk flexion test and one student was bouncing around on his stomach on the mat. Mr. Fit asked, "What are you doing? You doing the worm?" The student replied, "Backwards worm." Mr. Fit replied, "Backwards worm, oh that's awesome." In this case, the off-task behavior of the student was reinforced by Mr. Fit's comments. There were several other incidents of off-task behavior, such as students spinning and sliding on mats used for fitness testing, that were met by similar reactions from Mr. Fit.

## Teachers' Agendas

A teacher's agenda can be communicated through what teachers state as their objectives for a unit of learning (espoused agenda) as well as through their actions and instructional focus during instruction (enacted agenda). Both the teachers' espoused and enacted agendas were explored. Preunit interview data indicated that each teacher's espoused agenda was to teach and assess variables, such as working together in the O & C unit and knowledge of fitness concepts in the fitness unit.

While speaking about the O & C unit, Mr. Fit commented, “My goals are to expose the kids to a unit where they will learn from each other and work together in a group to meet the challenge of each station.” Ms. Adventure agreed with Mr. Fit when she replied, “I want them to work together and develop problem solving skills as a group. I want them to take on different roles and cooperate to solve problems.” Despite the common goal held for students to work together, additional comments in the preunit interview revealed that the teachers’ other goals differed, and neither really knew what the other’s goals were. For example, Mr. Fit commented, “I want them to learn the importance of safety in all areas.” While Ms. Adventure remarked, “I want them to challenge themselves to a level they feel comfortable.” As a result of the teachers’ divergent individual learning goals, the enacted agendas for each teacher differed, which resulted in different classroom ecologies depending on which teacher was responsible for instruction on a particular day of each unit.

Ms. Adventure’s espoused agenda for the fitness unit was that students were able to see the importance of fitness and that an individual had to work on fitness throughout their lifetime. Ms. Adventure remarked, “My goal is to cover the four areas of fitness. Fitness is a lifetime thing that you have to build upon. We spend a lot of time understanding what happens in each area and what activities improve that.” In addition, she wanted students to learn that fitness is more than sports and that individuals can do different things and still be fit.

Mr. Fit’s espoused agenda for the fitness unit paralleled Ms. Adventure’s agenda. He commented, “For each fitness concept, I want them to understand or delineate between each concept. I want them to understand what the activity would be in order to work out or exercise a portion of the body.” Mr. Fit also remarked that he wanted students to view fitness as a lifetime activity. He added, “I want my students to understand what a certain activity could do for their body and how important it is to do these things as part of a lifetime package.”

## Teachers’ Enacted Agendas, Activities, and Assessments

### ***Ms. Adventure’s Enacted Agenda, Activities, and Assessments in the O & C Unit.***

Ms. Adventure’s espoused agenda for the O & C unit was for students to work together and develop problem-solving skills as a group. In addition, she wanted students to take on different roles within the group and cooperate to solve problems. Field notes indicated that Ms. Adventure’s enacted agenda did pursue the goal of providing instruction to facilitate students learning how to work together to solve problems.

As stated earlier, the activities in the O & C unit provided students with opportunities to work together to solve problems. Each challenge activity was described on a task card that was posted at the area designated for each activity. Each task card contained a description of the challenge, the rules of the challenge, and the consequences for not following the rules of the challenge.

Since the assessments were embedded in the tasks, Ms. Adventure was able to provide instruction that allowed her to not only assess how well the students worked together to solve each challenge, but also the students were able to assess how well their group worked together. One student, Sam, articulated how he assessed himself and his group while trying to solve a challenge task. Sam commented,

We sort of completed it and we have gone farther than before because say you finished it and then you didn't quite finish it you wouldn't be successful. But if one time you went a quarter of the way and the next time you went half way you would be successful.

In addition to the assessments being embedded in solving the challenge tasks, Ms. Adventure also used questioning during lesson closures to assess how the students worked together to solve the challenge tasks. The following excerpt is an example from the lesson closure on Day 1 of the unit. Ms. Adventure asked, "At the stepping stones challenge, how did you solve the challenge, Jeff?" Jeff answered, "We held hands and jumped." Ms. Adventure then asked, "So that way they did not touch the bases at the same time. But you had to get everybody in a different order, so how did you decide who was jumping when? A student replied, "Say, I was in the middle and they were to my back, I would hold his hand and then we would jump. We jumped backward and then forward so now he was at my back." Ms. Adventure asked, "How did you come to that solution?" A student answered, "We got it wrong all the other times!" Although Ms. Adventure used questioning as a method to assess how groups solved each challenge, she was unable to assess each group daily because of a lack of time.

***Ms. Adventure's Enacted Agenda, Activities, and Assessments in the Fitness Unit.*** Ms. Adventure's espoused agenda for the fitness unit was to increase students' knowledge of health-related fitness concepts; however, she did not systematically pursue this outcome. The enacted agenda that she did pursue was focused on completing learning tasks and finishing the fitness testing activities. Ms. Adventure used question-and-answer segments to provide instruction about health-related fitness. In addition, learning activities such as taking and graphing heart rates provided opportunities for students to learn about these concepts, although she was not able to know whether students' understanding had improved because she did not formally assess this knowledge. Field notes indicated that the only assessment in this unit besides fitness testing was when Ms. Adventure informally assessed student knowledge by asking questions during a lesson in which only a couple of the students received an opportunity to demonstrate their understanding of health-related fitness concepts.

The other assessments in the unit, the Fitnessgram tests assessed students' level of physical fitness on specific health-related fitness items; however, they did not test the students' knowledge of health-related fitness. Although the Fitnessgram tests did not directly assess the students' knowledge of health-related fitness, they did contribute somewhat to Ms. Adventure's espoused agenda of increasing students' knowledge about health-related fitness because occasionally she instructed students in regard to which aspect of health-related fitness was to be assessed through selected fitness tests.

***Mr. Fit's Enacted Agenda, Activities, and Assessments in the O & C Unit.*** Mr. Fit's espoused agenda for students in the O & C unit was for students to learn to work together and learn to be safe in all areas. Although the activities that the students participated in provided ample opportunities to work together to solve problems, the enacted agenda of Mr. Fit did not provide the instruction necessary to facilitate the students' ability to achieve his espoused learning goals. Field notes

indicated that Mr. Fit never provided any explicit instruction about how to work together. Mr. Fit introduced each lesson by describing each challenge and the information contained on the task sheet for each challenge. The students participated in the challenges and Mr. Fit dismissed the class. The assessment for each task was determined by the extent to which the students worked together to solve each challenge. Although this was the case, there was never any specific instruction that would allow the students to actually discuss how they worked together to solve the challenges. Mr. Fit did not ask students at any time what they did to work together to complete the challenge tasks. This was unfortunate because a question-and-answer segment that allowed students to discuss how they worked together would have been instrumental in enabling Mr. Fit and the students to gain more information about the group processing used to successfully solve the challenge, as well as provide Mr. Fit with an informal assessment of how each group worked together to solve the challenges.

Mr. Fit's enacted agenda shifted from students working together to an agenda that focused on following the rules of the task, and safety and procedural issues. Student comments reflected Mr. Fit's focus on safety. When asked what Mr. Fit was looking for when he was assessing how well students could perform the challenges, Mark replied, "if you follow directions and if you weren't cutting in front of people and make sure you are not going too high or hurting yourself." Another student, Drew reported, "To be safe and not to run around."

Field notes provide further evidence of how Mr. Fit's enacted agenda was influenced by his focus on making sure the students followed the rules and consequences associated with each challenge in addition to safety. For example, field notes on Day 5 indicated that a group of students were struggling at the "toxic waste" challenge. The students were trying to dump a bucket of balls (toxic waste); however, they were having trouble getting the lip of the bucket low enough so they could pour the waste into the other bucket. Mr. Fit remarked, "Your ropes are touching the ground, you got to go back. Did you guys read the rules?" The students replied, "Yeah." Mr. Fit responded, "Yeah? Well you got to go back, the rope touched the ground, you got to go back." The group tried again, and Jeri Lyn exclaimed, "Whoever has the bottom rope pull back, bottom rope." The group still had trouble and Jeri Lynn put her foot on the bucket to steady it. After seeing this Mr. Fit responded "You can't do that. Read the rules. What are you supposed to do?" The students responded, "Go back."

### ***Mr. Fit's Enacted Agenda, Activities, and Assessments in the Fitness Unit.***

Mr. Fit's enacted agenda for the fitness unit was for students to further their understanding of health-related concepts. The activities in this unit included Fitnessgram tests and question-and-answer sessions to provide instruction about health-related fitness concepts.

Although he delivered a great deal of his instruction through question and answer, the other large piece of his instruction was the fitness testing tasks. It was during these tasks that his enacted agenda moved away from his espoused agenda of increasing students' knowledge about health-related fitness concepts. Once the students began doing the fitness-testing activities, Mr. Fit became focused on completing the fitness test items and neglected to provide any links between the fitness test items and health-related fitness concepts. As a result, the students believed that



they were being assessed on how well they performed the fitness test items and not how their fitness knowledge increased, which was what Mr. Fit had indicated as his learning objective for the unit.

Interview data supported the fact that the students believed that the goal of the unit was to score well on the fitness tests. Jill answered, "I had to do well on the fitness tests to impress my teachers." Furthermore, when asked what their teachers wanted them to learn, many students replied to see how many exercises they could perform on each of the fitness tests. For example, Jason replied, "They wanted to see how many push-ups and stuff I could do." Another student, Caleb, responded, "They wanted us to learn how to do the fitness tests and not get hurt."

Field notes indicated that although Mr. Fit had commented that he wanted students to increase their knowledge of health-related fitness concepts, the instruction and assessment he provided was minimal and was not systematically delivered in a manner that would further students' knowledge of these concepts. Mr. Fit's enacted agenda shifted from his espoused agenda of increasing students' knowledge of health-related fitness concepts to focusing on students performing the fitness-testing activities correctly and safely.

## Discussion

This study makes an important contribution to the literature because the results demonstrate that what teachers put forth as their agendas in the gymnasium and what they actually teach during a unit of instruction are not necessarily congruent. The two cases presented here provide an illustration of what happens when teachers fail to systematically implement their lessons in an instructionally aligned manner. Limited research in the area of instructional alignment in physical education has indicated that when broad outcomes are identified and instructional activities and assessments are congruent with these outcomes, students accomplish the learning goals that teachers set (Evans et al., 1999). Results from this study indicated that even though teachers identified broad learning outcomes and provided instructional activities and assessments that were congruent with the outcomes, students did not accomplish the espoused learning goals because an incongruity existed between teachers' espoused and enacted agendas.

As discussed earlier, the program of action encompasses instruction, order, the agenda a teacher has for the lesson and appropriate student response, and interactions necessary for the learning vector to maintain momentum and direction. Because a teacher's agenda is a component of the program of action, it is reasonable to suggest that an incongruity that exists between a teacher's espoused and enacted agendas would have an effect on the program of action. Hastie (2000) described a robust program of action as one that is characterized by student compliance and a high level of student engagement. In addition, the positive momentum of a robust program of action is not threatened because students are not placed in a position where they can attempt to negotiate a change in task or to negotiate lower teacher expectations. Results from the current study indicated that the incongruence that existed between each teacher's espoused and enacted agendas negatively impacted the program of action. For example, both teachers in this study remarked that they wanted their students to learn to work together in the O & C unit and to increase

the students' knowledge of health-related fitness in the fitness unit; however, both teachers shifted their agendas, to varying degrees, toward a focus on the content approach to instruction (safety, following the rules of the challenge task, and the procedures of the fitness tests) rather than staying focused on their espoused outcomes of students learning to work together and increase students' knowledge of health-related fitness. Perhaps this shift in their agendas may have occurred because variables such as safety and following rules and procedures of O & C tasks and fitness-testing tasks may have been easier to observe than what they had originally planned to teach and assess.

The shift in their agendas may have also been influenced by the alternating teaching practice that was employed by the teachers. This practice resulted in two different classroom ecologies and inconsistencies in terms of what was expected of students. The alternating teaching practice and the shift in agendas weakened the program of action because the teachers' enacted agendas differed from one another and the acceptable levels of student responses and behaviors established by each teacher were also different. As a result of the teachers' different agendas and expectations, the program of action fluctuated throughout the units and was never able to maintain momentum.

Another consequence of the shift in agendas was that neither teacher's espoused agenda of teaching the students to work together in the O & C unit was systematically pursued through instruction, nor was a concerted effort provided through systematic instruction to achieve the outcome of increasing students' knowledge about health-related fitness. In addition, the focus of each teacher's enacted agenda was not assessed in the manner that they had espoused. For the most part what was assessed, mainly through observation, was the extent to which students followed directions about how to conduct fitness-testing items, the rules and consequences of the problem-solving activities, and safety. As a result, there was no instructional alignment between the teachers' espoused agenda, lesson tasks, and assessments.

Previous research has described instructional alignment in physical education in terms of the program of action and assessment strategies that teachers used as being congruent with the goals of the project (Ward, 1999; Evans, et al., 1999). The fact that the two teachers in the current study held different instructional goals for the O & C unit contributed not only to a weakened program of action, but also to the absence of instructional alignment. The findings of the current study extend this research further by providing evidence that it is not only the expressed goals of the teachers that need to be congruent with the assessment strategies, but, as well, how their goals actually unfold in their enacted agenda throughout a unit.

One aspect of the O & C unit that did contribute to the program of action was that the students were motivated by the content, which strengthened the student social system. In the O & C unit, the content provided students with clear meaningful goals, which encompassed the students' agenda in a way that strengthened the program of action and contributed to the students completing the tasks. In addition, because the assessment was embedded in each O & C task, solving the challenges became more meaningful (i.e., interesting and challenging) to the students. As a result, the students were motivated to work together to solve each challenge. Furthermore, this finding replicates the results from other studies, which have indicated that the program of action can be strengthened when the students' social agendas are considered (Carlson & Hastie, 1997; Hastie, 2000).

Results in the current study indicate that the student social system appeared to be driving the instructional task system in the O & C unit. The student social system was supported by both teachers' focus on safety and following the rules and consequences listed on the task cards, which helped to minimize off-task behavior. Hastie (1995) found that the student social system operated in a similar manner at an outdoor secondary adventure camp. Hastie's results indicated that the student social system drove the instructional task system even when the only accountability provided was the safety aspects of the activities.

## Conclusion

This study provides some insight into the ecology of physical education and on one aspect of alignment, specifically the relationship between teachers' enacted agenda, learning activities, and assessments at the micro (unit) level, and it provides some insight into the relationship between these factors on a macro level. Specifically there was a lack of alignment at Far Elementary School between the Massachusetts frameworks, the teachers' enacted agendas, instructional activities, and assessments. Results of this study provide evidence that even in this era of standards-based instruction, teachers still have a tendency to strongly focus on variables such as safety, following directions, and procedures. Variables such as safety, following directions, and procedures should be seen as part of teachers' agendas, in addition to assessment procedures that allow teachers to pursue products of instruction that assess how well students have met teachers' learning outcomes.

Implications from this research include focusing more on the connections between standards-based instructional planning, instructional tasks, and assessment. In addition, preservice and in-service teachers should be encouraged to systematically align their planning, teaching, and assessments to demonstrate that student learning is purposeful and what the teacher actually intends rather than incidental.

Future research is needed that examines the relationship between the ecology of physical education and instructional alignment at levels other than elementary school. Furthermore, the interaction between the ecology and instructional alignment should be investigated in different units of instruction to determine whether the type of activity has an effect on the ecology and instructional alignment that occurs in a unit.

## References

- Allen, J.D. (1986). Classroom management: Students' perspectives, goals and strategies. *American Educational Research Journal*, 23, 437–459.
- Carlson, T.B., & Hastie, P.A. (1997). The student social system within sport education. *Journal of Teaching in Physical Education*, 16, 176–195.
- Cohen, S.A. (1987). Instructional alignment: Searching for the magic bullet. *Educational Researcher*, 16(8), 16–20.
- Constas, M.A. (1992). Qualitative analysis as a public event: The documentation of category development procedures. *American Educational Research Journal*, 29, 253–266.
- Doyle, W. (1979). Classroom tasks and students' abilities. In P.L. Peterson & H.J. Walberg (Eds.) *Research on Teaching: Concepts, findings and implications* (pp. 183-209). Berkeley, CA: McCutchan Publishing Co.

- Doyle, W. (1986). Classroom organization and management. In M.C. Wittrock (Ed.), *Handbook of Research on Teaching* (3rd ed., pp. 392–431). New York: MacMillan.
- Evans, S.A., Nguyen, P.T., Barrett, T.M., Johnson, M.K., Doutis, P., Brobst, B., et al. (1999). Curriculum effects in seventh-grade pickle ball. *Journal of Teaching in Physical Education, 18*, 444–454.
- Fahey, P.A. (1986). Learning transfer in main ideas instruction: Effects of instructional alignment and aptitude on main idea test scores. (Doctoral Dissertation, University of San Francisco, 1986). *Dissertation Abstracts International*, 48/03A.
- Hastie, P.A. (1995). An ecology of a secondary school outdoor adventure camp. *Journal of Teaching in Physical Education, 15*, 79–97.
- Hastie, P.A. (2000). An ecological analysis of a sport season. *Journal of Teaching in Physical Education, 19*, 355–373.
- Hastie, P.A., & Pickwell, A. (1996). A description of a student social system in a secondary school dance class. *Journal of Teaching in Physical Education, 15*, 171–187.
- Hastie, P.A., & Siedentop, D. (1999). An ecological perspective on physical education. *European Physical Education Review, 5*(1), 9–29.
- Jones, D.L. (1992). Analysis of task systems in elementary physical education classes. *Journal of Teaching in Physical Education, 11*, 411–425.
- Kneer, M. (1986). A description of physical education instructional theory/practice gap in selected secondary schools. *Journal of Teaching in Physical Education, 5*, 91–106.
- Koczor, M.L. (1984). Effects of varying degrees on instructional alignment in post treatment tests on mastery-learning tasks of fourth-grade children. (Doctoral Dissertation, University of San Francisco, 1984). *Dissertation Abstracts International*, 46/05A.
- LeCompte, M.D., & Preissle, J. (1993). *Ethnography and qualitative design in educational research* (2nd ed.). San Diego, CA: Academic Press.
- Lund, J.L. (1993). The role of accountability and assessment in physical education: A pedagogical view. In J.E. Rink (Ed.), *Critical Crossroads: Middle and secondary school physical education* (102–112). Reston, VA: National Association for Sport and Physical Education.
- Lund, J., & Tannehill, D. (2005). *Standards-Based Physical Education Curriculum Development*. Boston, MA: Jones & Bartlett Publishers, Inc.
- Massachusetts Comprehensive Health Curriculum Framework (1999). Massachusetts Department of Education.
- Merriam, S.B. (2001). *Qualitative research and case study applications in education* (3rd ed.). San Francisco, CA: Jossey-Bass Publishers.
- Miles, M.B., & Huberman, A.M. (1994). *Qualitative data analysis* (2nd ed.). Thousand Oaks, CA: Sage Publications, Inc.
- Neuman, W.L. (1994). *Social Research Methods: Qualitative and quantitative approaches* (2nd ed.). Boston: Allyn & Bacon.
- Siedentop, D. (1988). *An ecological model for understanding teaching/learning in physical education*. Paper presented at Scientific Congress, Seoul. South Korea.
- Siedentop, D., & Tannehill, D. (2000). *Developing teaching skills in physical education* (4th ed.). Mountain View, CA: Mayfield Publishing Company.
- Strauss, A., & Corbin, J. (1998). *Basics of qualitative research. Techniques and procedures for developing grounded theory* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Tallarico, I. (1984). Effects of ecological factors on elementary school student performance on norm-referenced standardized tests: Nonreading behaviors (testwiseness). (Doctoral Dissertation, University of San Francisco, 1984). *Dissertation Abstracts International*, 45/12A.
- Ward, P. (Ed.). (1999). The saber-tooth project: Curriculum and workplace reform in middle school physical education [Monograph]. *Journal of Teaching in Physical Education, 18*, 379–494.

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