Systematic observational instruments are used to objectively describe teacher/student interaction in the classroom or sports field. These tools have come to replace, or at least augment, other more traditional forms of data collection of teacher and student behaviors such as eyeballing, anecdotal recording, rating scales, and checklists. These traditional forms of observation and assessment have come under scrutiny for a variety of reasons as they are seen to be not very objective, reliable or specific. "Opinions are based on the observer's personal biases and history of experiences" (van der Mars, 1989, p. 7).

Systematic observation when used correctly, on the other hand, has been found to be a very reliable and specific means of recording classroom events and activity.

The use of systematic observation initially became popular within physical education as a research tool in the 1970's (see Mancini et al., 1985 for an overview). Its popularity caught on so quickly, however, that Locke (1983) observed that systematic observation had become prevalent in the training of pre-service physical education teachers as well. Today, this training extends beyond pre-service populations to include in-service training of teachers to help them better understand their own teaching and the complex interactions that occur between teacher and students. Two of the most popular systems used over the past 20 years, and still today, are Cheffers' Adaptation to Flander's Interaction Analysis System (CAFIAS) and Academic Learning Time - Physical Education (ALT-PE).
CAFIAS

What exactly is CAFIAS? It is a system that requires the observer to be trained in the use of certain codes that signify particular teacher and/or student behaviors. The observer sits within the classroom or field environment and codes behaviors every three seconds, or as often as they change. According to Cheffers et al. (1980) the categories of CAFIAS are as follows in Table 1.

![Table 1 - CAFIAS Categories and Descriptions](image)

<table>
<thead>
<tr>
<th>Teacher's behavior</th>
<th>2</th>
<th>12</th>
<th>Praise; encouragement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>13</td>
<td>Acceptance of student's ideas &amp; actions</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>14</td>
<td>Questions</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>15</td>
<td>Information-giving; lecture</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>16</td>
<td>Direction-giving</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>17</td>
<td>Criticism</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student's behavior</th>
<th>8</th>
<th>18</th>
<th>Predictable, rote response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8'</td>
<td>18'</td>
<td>Interpretive response</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>19</td>
<td>Unpredictable response</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td></td>
<td>Confusion, Silence</td>
</tr>
</tbody>
</table>

Therefore, when a coder observes the teacher asking a question, they will record a 4. If she or he raises their hands up in a questioning manner without verbally asking a question then the code is recorded as a 14. Once the session is finished the observer takes the data collected and enters each code into a computer software programme. A seven page report is then printed out with an analysis of the teaching lesson. One analysis performed, for example, assigns each coding category a given percentage of the overall total time of the lesson. An analysis of total teacher talk versus student talk and activity is done. A third example is the percentage of direct versus indirect teaching that has occurred in the lesson.
It is important that the observers are reliable in their coding. In other words, if someone else were to code the same lesson the codes should be similar for both coders. The CAFIAS system has been proven to be both valid and reliable but the coders need to be trained to be reliable as well. Coders need to familiarize themselves with the system and practice coding; first taped, and then 'live' lessons. Two coders then code a lesson and input their separate data into the computer. The resulting analysis must then be checked for reliability. When using CAFIAS, the Spearman Rho rank correlation method is often used. Coders who obtain a reliability coefficient of .746 or above when ranking their top ten cells have obtained a level of significance at the .01 level and therefore are deemed to be very reliable in their use of CAFIAS (Cheffers et al., 1980).

Several studies were done to see if prospective physical education teachers behaviors would be influenced if they were trained in the use of CAFIAS as an undergraduate. These studies found that CAFIAS training did have an impact on subsequent practice teaching behaviors. Specifically teachers praised and accepted their students' ideas and efforts more, made greater use of questioning, and their students' contributions were greater in their classes than teachers who were not trained in CAFIAS. Further studies to ascertain if these differences would carry over several years after the teachers were teaching full-time in the schools demonstrated the same results (Mancini, et al., 1985).

The benefits of CAFIAS training can extend beyond teacher preparation. In fact it can be used to:

1. describe current classroom practices; 2. modify teacher behavior; 3. provide a tool for the analysis of teaching; 4. give feedback about one's own teaching; 5. train student teachers; 6. discriminate among patterns of teaching; 7. determine the relationships between various classroom behaviors and student growth; 8. help project future teaching patterns. (Batchelder & Cheffers, 1978, p. 2).

All systematic observer instruments do, however, have weaknesses. There is no one perfect system. CAFIAS does a good job of describing teacher behaviors and teacher/student interaction but the data can be skewed as the focus of the coding is on the
teacher. As coding is done at least every three seconds or even faster if the teacher is very active and changing behaviors, when the total number of codes are entered it may appear as though the teacher is dominant to the detriment of the students. That may in fact only appear to be true. If the students are busy practicing a basketball drill and the teacher is just watching the coding would be of the students every three seconds, say 18, 18, 18, etc. But if the teacher is giving a lot of feedback and encouragement there will be less 18's and more 2's for example. Therefore, the authors feel that another observer system besides CAFIAS should also be used; one that focuses more on the student. ALT-PE is one such system.

ALT-PE

Academic learning time-Physical Education (ALT-PE) is an observation system that utilises a unit of time which measures whether a student is engaged in relevant physical education content in such a way that he or she has an opportunity to experience success and therefore learn.

In this system, the observer is trained to recognize certain happenings in a physical education lesson and code these behaviors every five seconds (see table 2). The observer focuses on one student in the class at random and codes his/her behavior for the entire lesson.

Table 2 - ACT-PE Behavior Categories

| Management (M) | Organizational non-academic tasks, class business unrelated to instructional activity. |
| Transition (T) | Managerial episode within or between activities (i.e., change courts, move from one activity/station/drill to another, substitution in game situations. Time pupils spend listening to or performing organizational activities related to instruction (i.e., team selection, changing equipment, moving from one space to another, changing stations, changing activities within a lesson). |
Activity (A) – Motor engaged time, skill practices, drills, scrimmages, games, fitness activities, dance, spotting, warm up and cool down, supporting activities. Time that a pupil is appropriately engaged in a subject matter motor activity.

Knowledge (K) – Time spent listening to teacher or peers discussing skills, watching a demonstration, discussing rules. Substantive verbal/non-verbal behavior such as lecturing, explaining, demonstrating, communication of information about knowledge of subject matter. Knowledge is subject matter related.

Waiting (W) – Time after skill practice activities, drills and modified games. Time in which pupils are not involved as they wait for the next opportunity to respond. Time in which pupils do nothing that contributes to the goals of the lesson (i.e. "wait time", wait in a line for a turn, being on a team but not actively involved). Waiting occurs after a lesson has begun.

Off Task (OT) – When a student is not engaged in an activity he/she should be engaged in, behavior disruptions, misbehavior, talking when teacher is giving instruction, misusing equipment, disrupting the activity through inappropriate behavior. Situation specific.

The concept of opportunity to respond, measured through ALT-PE or by frequency of appropriate trials, represents the best criterion process variables to use to assess teaching skill.

Improved teaching skills should show up in more and better opportunities for students to learn. The teaching skills themselves have little inherent meaning. They derive their meaning from their influence on student learning and therefore should be evaluated in terms of criterion process variables that are valid measures of student learning.

The theoretical basis of the ALT-PE system is learning theory (Siedentop, 1991). In learning theory certain principles are accepted as fact:

1. Learning is maximized in direct proportion to the number and type of opportunities to learn.
2. We learn best by concentrating on practicing the motor, cognitive, or psychomotor skill by actually doing; or by observing others doing the skill.

3. There is no advantage to be gained in practicing the skill at a difficulty level that results in a level of failure rate greater than 10 percent.

Effective teaching means structuring the lesson to maximize the amount of time in direct practice by each individual at a level which at once ensures a continuing development of the skill compatible with the minimum number of mistakes.

Conclusion

The authors believe that using systematic observer systems as part of teacher training or in-service training helps teachers to better understand the teaching/learning process. It has also been shown that exposure to these systems can improve teaching and is an effective instrument in objectively describing classroom behavior. Teachers who are trained in these systems can also help fellow teachers better understand what they are doing in class and how, perhaps, they can improve their own teaching. These systems have been used effectively in the evaluation of teachers as they are objective and reliable forms of reporting what is occurring in classroom, multiple purpose hall, and field settings.

References


