Assessment in Elementary School Physical Education

Mary Ann Roberton, Ph.D.
Learning the Jargon

• Basic measurement concepts/words we need to understand
  - Test characteristics
    • Validity*
    • Reliability
  - To what should a child’s test results be compared?
    • To group norms
      - (Norm-referenced evaluation)
    • To performance criteria
      - (Criterion-referenced evaluation)*
    • To their own progress*
  - When assessment takes place
    • Summative assessment
    • Formative assessment*
What student characteristics should physical educators assess?

- Cognitive understanding
- Affective (emotional) attitude
- Motor skill
- Physical fitness
Measuring Human Movement

2 types of measures that can be useful:

- Movement *product scores* (also called performance or outcome scores)
- Movement *descriptions* - how the movement looks
Product Scores

• Measure an outcome/result of the movement
• Are quantitative - they use numeric data
• For example,
  - product scores for walking might include
    • total distance walked or the velocity of the walk
  - Product scores for throwing might be
    • distance thrown or ball velocity
Movement Description

• Uses words to describe movements
• These descriptions can be based either on
  - An “error” perspective
  - A “developmental” perspective
Error perspective:

• The error model compares the form of a motor task with how an elite adult might perform the task.

• Movement that varies from “good form” is considered an error.

  - Thus, the error model takes a negative view of any movements that look different from elite movement
The error model does not recognize that change occurs on an observable continuum between the initial movements of young or inexperienced persons and the most advanced or elite movers.

The error model does not credit movements that occur between the extremes of this developmental continuum.
A Developmental Perspective

• In contrast, a developmental perspective does not consider any movement “wrong”

• movement is simply classified or located on the developmental continuum.

  - it gives “credit” for the way a person does move; and

  - it expects movement to change over time (with the help of the teacher) to more advanced categories on the continuum.
Developmental Description

• The easiest way to do this is to use
  - Developmental sequences
Comparing “Process” and “Product”

Product Score
• Strength:
  - easier to obtain

Developmental Description
• Strength:
  - Is diagnostic (tells you where the child is on the developmental continuum).
Comparing “Process” and “Product”

**Product Score**
- Weakness: non-diagnostic (the score alone does not tell you what kind of movement caused it)

**Movement Description**
- Weakness: the teacher needs to be a good observer and know the developmental sequences
A Challenge:

We frequently don’t know the relationship between a movement’s product score and the movement level of development that produced that product.
So, what is “Best Practice” in this case?

• **Recommendation #1:** Measure both movement product scores and developmental levels, if possible.

• **Recommendation #2:** If you can only measure one thing, assess the child’s developmental level.
Farmington, Michigan teachers are in the process of adopting developmental sequences and developmental task analysis

- for their daily assessment tools

- for the report cards that go home
Dear Parent,

The back of this form is your child's developmental task analysis (DTA) grid. You will notice that it is different from the evaluation on your child's report card. The report card mark reflects their skill mastery of the skill performed in isolation. The DTA grid reflects how your child performs the skill in progressively challenging game environments. We use DTA grids to individualize instruction for your child. During skill instruction, your child has been an active participant in his or her own assessment. They have also been regularly assessed by peers and by me. This form is intended to give you a working knowledge of your child's progress. We will use this same form throughout elementary school so that we can chart your child’s growth from year to year. Consequently, younger children should have more squares filled in at the top and older children should be making progress toward the bottom. Please discuss it with your child and feel free to call or email with any questions you may have.

Sincerely,

Greg Thompson
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## OVERARM THROW FOR FORCE -- DTA GRID

<table>
<thead>
<tr>
<th></th>
<th>8 feet</th>
<th>16 feet</th>
<th>24 feet</th>
<th>30 feet</th>
<th>38 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hit wall, no bounce</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hit wall above line</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hit wall below line</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternate above and below line</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right of vertical line</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left of vertical line</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternate left and right of vertical</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top right quarter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top left quarter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom right quarter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom left quarter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoola hop target</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bowling pin target</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rolling hoop target</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### DTA process

Students must perform task 3 consecutive times to advance from one square to the next. At each level, the student can self assess, have a peer assess, or have the teacher assess. Every 4 squares, the teacher must assess at least once. A student may not self assess two squares in a row. Once a square is completed, the student shall write the date and the assessment symbol: S=self assess, P=peer assess, T=teacher assess.

### Product scores
<table>
<thead>
<tr>
<th>Ball Type---&gt;</th>
<th>8&quot; Gator Ball</th>
<th>6&quot; Gator Ball</th>
<th>4&quot; Yarn Ball</th>
<th>Sponge Football</th>
<th>Tennis Ball</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two handed underhand throw for self</td>
<td>3 ft.</td>
<td>6 ft.</td>
<td>10 ft.</td>
<td>3 ft.</td>
<td>6 ft.</td>
</tr>
<tr>
<td>One handed underhand throw for self</td>
<td>3 ft.</td>
<td>6 ft.</td>
<td>10 ft.</td>
<td>3 ft.</td>
<td>6 ft.</td>
</tr>
<tr>
<td>Ball Type---&gt;</td>
<td>4&quot; Yarn Ball</td>
<td>Sponge Soft Ball</td>
<td>6&quot; Gator ball</td>
<td>Sponge Football</td>
<td>Tennis Ball</td>
</tr>
<tr>
<td>Two handed underhand throw for partner</td>
<td>10 ft.</td>
<td>20 ft.</td>
<td>30 ft.</td>
<td>10 ft.</td>
<td>20 ft.</td>
</tr>
<tr>
<td>One handed underhand throw for partner</td>
<td>10 ft.</td>
<td>20 ft.</td>
<td>30 ft.</td>
<td>10 ft.</td>
<td>20 ft.</td>
</tr>
<tr>
<td>Overarm throw-static thrower to static partner</td>
<td>10 ft.</td>
<td>20 ft.</td>
<td>30 ft.</td>
<td>10 ft.</td>
<td>20 ft.</td>
</tr>
<tr>
<td>Overarm throw-static thrower to jogging partner</td>
<td>10 ft.</td>
<td>20 ft.</td>
<td>30 ft.</td>
<td>10 ft.</td>
<td>20 ft.</td>
</tr>
<tr>
<td>Overarm throw-static thrower to running partner</td>
<td>10 ft.</td>
<td>20 ft.</td>
<td>30 ft.</td>
<td>10 ft.</td>
<td>20 ft.</td>
</tr>
<tr>
<td>Overarm throw-jogging thrower to static partner</td>
<td>10 ft.</td>
<td>20 ft.</td>
<td>30 ft.</td>
<td>10 ft.</td>
<td>20 ft.</td>
</tr>
<tr>
<td>Overarm throw-running thrower to static partner</td>
<td>10 ft.</td>
<td>20 ft.</td>
<td>30 ft.</td>
<td>10 ft.</td>
<td>20 ft.</td>
</tr>
<tr>
<td>Overarm throw-jogging thrower to jogging partner</td>
<td>10 ft.</td>
<td>20 ft.</td>
<td>30 ft.</td>
<td>10 ft.</td>
<td>20 ft.</td>
</tr>
<tr>
<td>Overarm throw-running thrower to jogging partner</td>
<td>10 ft.</td>
<td>20 ft.</td>
<td>30 ft.</td>
<td>10 ft.</td>
<td>20 ft.</td>
</tr>
</tbody>
</table>
In addition, the Farmington District teachers are using developmental sequences in “authentic situations”

• If a sequence exists (cf. Haywood & Getchell, 2005), they will use it as their “rubric.”

• If one doesn’t exist, they are hypothesizing a sequence and gathering data to test it.
  - “Authentic situations” means game-like situations.
**An Hypothesized Sequence**

<table>
<thead>
<tr>
<th>Hand Dribble- Developmental sequence- Thompson, 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Arm Component</strong></td>
</tr>
<tr>
<td><strong>1. Slapping Action</strong> , Elbow extension may be combined with shoulder flexion. Elbow flexion may occur in synch or out of synch with the ball rising to the apex of its bounce.</td>
</tr>
<tr>
<td><strong>2. Pushing/Late contact” Puppet”</strong>- Hand contacts ball approximately at apex of bounce. Shoulder may extend and elbow may flex as ball rises. Hand appears to rise with ball like a string puppet.</td>
</tr>
<tr>
<td><strong>3. Pushing /&quot;High Riding”</strong>- Elbow is flexed as ball rises. Hand contact occurs below the apex of the ball’s rise. Elbow continues to flex as ball rises. Elbow extends to push the ball to floor. Extension continues after ball leaves the hand. Ball rise</td>
</tr>
<tr>
<td><strong>4. Pushing /&quot;Low Riding”</strong>- Elbow is flexed as ball rises. Hand contact occurs below the apex of the ball’s rise. Elbow continues to flex as ball rises. Elbow extends to push the ball to floor. Extension continues after ball leaves the hand. Ball rise</td>
</tr>
</tbody>
</table>
Authentic Assessment Games for Hand Dribble

Note: The target motor behavior is dribbling while running. All games are designed to elicit running.

Kindergarten - “Puppy Farm” Thompson, 2005
All students get a “puppy” and are instructed to find personal space. After naming their puppy and rewarding them for sitting in their lap, each child is encouraged to dribble in personal space without traveling. We pretend that each hand is a different leash and we practice dribbling with each leash. Next, invite everyone to take their “puppy” for a walk. Use the basketball court boundaries lines to contain the activity.

Try the following Progression:
• Use the lines as sidewalks. See if their puppy can stay on the sidewalk.
• Switch leashes every time they change to a new sidewalk.
• Teach their puppy to count. Do three dribbles with each leash.
• Take their puppy for a jog. Try to keep it on the farm (inside the boundary lines).
• Take their puppy for a jog on the sidewalks.
• Practice jogging and switching leashes when they come to a new sidewalk.
• Practice running when they have open space in front of them. As before, try to keep your puppy on the farm.
Motor Development “Tests”

- Instead of assessing developmental levels, some teachers want to use “tests.”
- If you decide to use a test, be sure you look at the items carefully to see what they are measuring.
Motor Development Tests

• Are the scores movement descriptions or product scores?
• Does the test have a developmental perspective instead of an error perspective?
Assessing Children's Motor Development

- Now, let’s look at one item from the Bruininks-Oseretsky Test of Motor Proficiency (Circle Pines, MN: American Guidance Service), 1978.
SUBTEST 5 / Item 1  
Bouncing a Ball and Catching It with Both Hands

“The subject stands on the standing mat, bounces the tennis ball on the floor, and catches it with both hands.

The number of correct catches is recorded.

Trials: 1 practice, 5 recorded.”
SUBTEST 5 / Item 1
Bouncing a Ball and Catching It with Both Hands

*Figure 24* Example of an incorrect catch — subject trapping ball against body (Subtest 5: Items 1-4).
“ADMINISTERING AND RECORDING
Say: **Stand on the mat. When I say begin, bounce the tennis ball on the floor and catch it with both hands** (demonstrate). **Keep your feet on the mat.**

Give the subject one practice trial. If necessary, remind the subject to bounce, not drop, the ball. Then say: **Keep bouncing and catching the ball with both hands until I tell you to stop. Ready, begin.**

(it may be easier for young subjects to catch the ball with their hands held palms up.)"
SUBTEST 5 / Item 1
Bouncing a Ball and Catching It with Both Hands

“Count the number of correct catches made in five trials.

A catch is incorrect if the subject:

a. misses the ball or traps it against the body, as shown in Figure 24
b. steps off the mat
c. catches the ball with one hand.”
Bruininks-Oseretsky Test of Motor Proficiency

• “Between trials, repeat instructions as necessary. After five trials, tell the subject to stop. Take the ball away to prevent any practice between items.

• On the Individual Record Form, record the number of correct catches.”
Assessing Children’s Motor Development

Let’s consider this test item:

1) Developmental validity:
   • Does it measure product scores or movement description?
   • Does it have a developmental or an error perspective?
   • Therefore, is it valid developmentally? (does it tell you the child’s developmental level in catching?)
Assessing Children’s Motor Development

• Also, is it reliable?

  - (are 5 trials enough to get a sense of the child’s developmental level in the various components of catching?)
Assessing Children’s Motor Development

• If you questioned the developmental validity of this item, you were wise.
  - It has an error perspective.
  - In fact,
    • Both trapping the ball and moving to catch the ball are “incorrect”, but
    • The developmental sequences for catching say that one is primitive developmentally and one is advanced
  - It is not diagnostic. How would the score indicate how to help the child?
Assessing Children’s Motor Development

• If you evaluated the same child using the developmental sequences for catching,
  - you would know considerably more about that child’s catching development than knowing their score on the Bruininks’ test.
Acrobat Document
• Now it’s your turn.......let’s evaluate some tests