NEW APPROACHES IN PHYSICAL FITNESS AND MOTOR ABILITY TESTING

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Physical fitness and motor ability tests are designed to measure the physiological attributes of an individual. Traditionally, physical fitness performance testing consists of a battery of tests which consumes a lot of time and maximum effort.

Designing a battery of tests is simply a group of fitness tests that **closely represents the various physiological demands of your sport or event**.

First step is to breakdown the sport or simply an assessment of students in a certain institution into its different fitness components.

Each test must replicate the energy demands **and** the movement patterns within the sport.

- Walking 1 mile as quickly as possible (Rockport test) is less sport-specific than running in 20m bursts backwards and forwards (Multistage shuttle run).

Once the precise energy and movement demands of the sport are understood, the most appropriate physical fitness tests can be chosen. In fact the athlete or coach can even make their own test up so long as it meets the following criteria:

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- What is a Good Test?
  - Many of the procedures in collecting meaningful data depend largely on the quality of the measuring instrument/test employed in the process
  - When selecting or constructing a test, consider the following:
    - Whether the criterion-reference individuals are expected to perform t a specific level of achievement) or norm-referenced measurement (interpret each individual's performance on a test in comparison with other individual's performances using norms that enable the tester to interpret one's score in relation to the other in at the same population) should be used
    - The criteria for determining a good test – **validity, reliability, objectivity and administrative feasibility**

- Validity – Referred to as the degree to which a test actually measures what it really purports to measure; also refers more to the agreement between what the test measures and the performance, skill or behavior the test is designed to measure
  - Specific to the a particular use and group; a test may be for one age group but not valid for a different age group

- Reliability – refers to the consistency, of a test; the degree of consistency, and precision or accuracy that a measuring instrument demonstrates
  - A reliable test should obtain approximately the same results regardless of the number of times it is administered although some individuals may not obtain the same score on the on the second administration due to some factors may affect the scores such as:
    - Fatigue
    - Motivation
    - Environmental conditions
    - Measurement errors

- Relationship between Validity and Reliability
  - For a test to have a high degree of validity, it MUST have a high degree of reliability; if test scores are not reliable, the validity of the test is limited
  - Lack of consistency influences the validity of the test, though high reliability does not necessarily mean high validity ; a test may be consistent but it may not measure what it claims to measure
  - " Reliability for a procedure is essential before its validity can be considered and the actual reliability sets the ceiling for the maximum validity the instrument/test can possess". This relationship is obviously limited to statistical components of both characteristics; to say that "validity depends on reliability is fallacious

- Objectivity
  - A test has high objectivity when two or more persons can administer the same test to the same group and obtain approximately the same result
  - A specific form of reliability and can be determined by the test-retest (with different individuals administering the test) correlational procedure

- Administrative Feasibility
  - Along with validity, reliability and objectivity must be considered when selecting or constructing a test
  - If two tests are fairly equal in validity, reliability and objectivity, the following administrative factors may determine which test you should choose:
    - Cost
    - Time
    - Ease of administration
    - Scoring
    - Norms

Physical Fitness and Motor Ability Test Selection

Fitness tests allow Physical Education teachers to identify physical strengths and weaknesses. They act as a benchmark upon which a suitable training program can be developed.

In fact without an initial assessment any subsequent training may only address already strong areas while neglecting the athlete's/student's weak points.

There are several reasons why fitness tests should form an integral part of the overall school program:

- **Benchmarking**

  A series of suitably selected tests builds a physical profile of the athlete. A benchmark can be set for each component of fitness. By comparing where the athlete/ student is now to norms and standards, any major areas of weakness can be identified.

- **Goal Setting**

  Setting specific and measurable goals is a fundamental part of the modern-day athlete's approach to sport. It's not enough to say "I want to be fitter". It's not even enough to say "I want to be faster over 40 yards". A more appropriate target would be to "reduce my 40yard sprint time by 0.5 seconds by the end of the pre-season". Of course you can only set realistic and attainable goals like these if you know where you are starting from.

- **Feedback**

  The only way to determine whether a program is achieving the desired results is to test regularly.
- **Motivation**

  Taking objective measurements before and after a period of intervention can show a student how far they have progressed. It's one thing to **feel** fitter or faster or stronger, but seeing definite results in black and white is usually more inspiring.

  Whatever level you perform to, do not overlook the importance and necessity of fitness testing. If you take the time to plan your training then take one afternoon (or morning) to complete a battery of fitness tests.

New Trends and Approaches

- Use of machines and electronic devices
  - Bio-electric impedance Analysis
    - Body fat scales use the Bioelectrical Impedance Analysis (BIA) technique. This method measures body composition by sending a low, safe electrical current through the body. The current passes freely through the fluids contained in muscle tissue, but encounters difficulty/resistance when it passes through fat tissue. This resistance of the fat tissue to the current is termed 'bioelectrical impedance', and is accurately measured by body fat scales. When set against a person's height, gender and weight, the scales can then compute their body fat percentage.

- Chronojump Project - The Chronojump Project is an Open Hardware and Freeware developed by Xavi De Blas, a Sports Science Professor from University of Ramon Llull, Spain. The technology measures contact performance parameters applicable in sports peformance (agility, speed, reaction time, reactive strength etc..). Through the contact implement (push button, platform, timing lights) connected to chronopic and to the computer, variables are displayed in the Chronojump Software

- Polar Heart Rate watch (model: l FT 40 or 60) – a gadget used to measure the cardiovascul fitness level

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- The Department of Sport Science of the U.P. College of Human Kinetics has designed testing protocols which are more efficient and some requires minimum duration and effort. With the advent of technology, it also utilizes advanced equipment where tests are even constructed based on the specific requirements of the sport

Sample of FitnessTesting Protocols

1. Testing if national athletes 3 months prior to the 2011 SEA Games

Station 1. Height, Weight and % Body Fat

Station 2. VO2 max using Polar Heart Rate watch (model: 1 FT 40 or 60)

Station 3. Warm-Up: 5 minute Jogging

Lunge, Reach

1x5/leg

Rev Lunge, Twist
1x5/leg

Leg Swing, crossover
1 x 5/leg

Knee Hug, Quadstretch
1x5/leg

Rest: 2 minutes (Explain/Practice

Movement Competency Screen) -

Developed by Matt Kritz from Auckland University of Technology, The Movement Competency Screen (MCS) is a screening tool using 5 exercises in determining functional movement specific to an exercise. Each movement is analyzed by determining notable movement errors using video technology. A score is derived from the summation of primary and/ or secondary movement errors (1, 2 or 3) upon careful scrutinization of a movement pattern.

Station 4. Movement Competency Screen

1. Squat

2. Lunge and twist

3. Push-up

4. Upper Body Pull

5. One-leg Squat

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2 Minutes Rest

Station 5. Reaction Time: 2 Trials/leg: 15 sec rest in between trials

30 sec rest in between leg trials

Rest: 1 minute

Station 6. Upper Body Power: Plyo Push-Up:

2 Trials: 15 sec rest in between trials

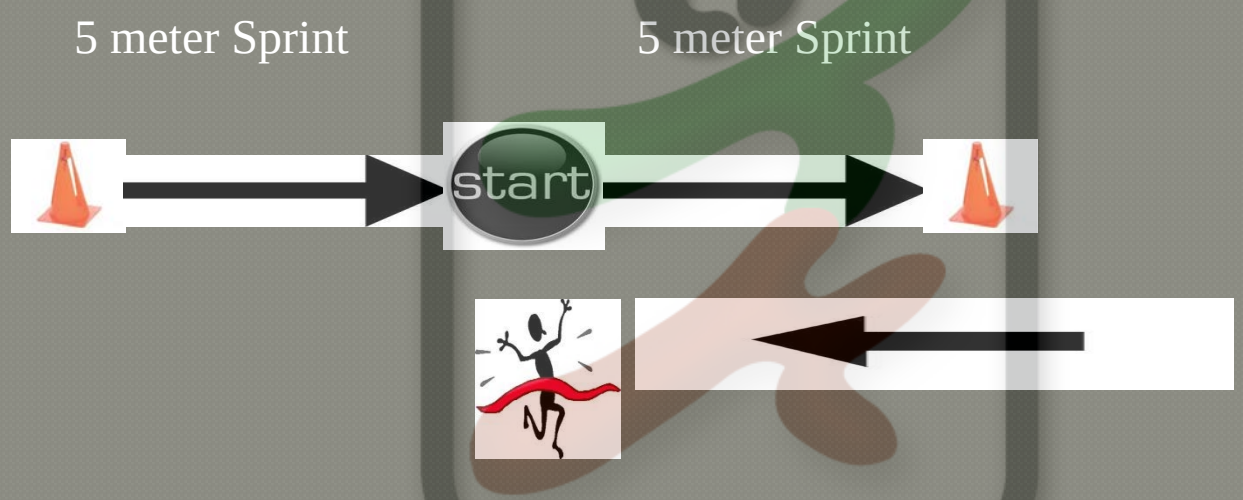
Rest: 1 minute

Station 7. Lower Body Power: Abalakov Jump or Vertical Jump: 2 Trials: 15 sec rest in between trials

Rest: 2 minutes

Station 8: 10 m Sprint Test: Flying Start: 2 Trials: 2 minute rest in between trials

Station 9: Agility (505 Test Flying Start)



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Pictures during the testing of National Athletes bound the 2011 SEA Games in Jakarta, Indonesia

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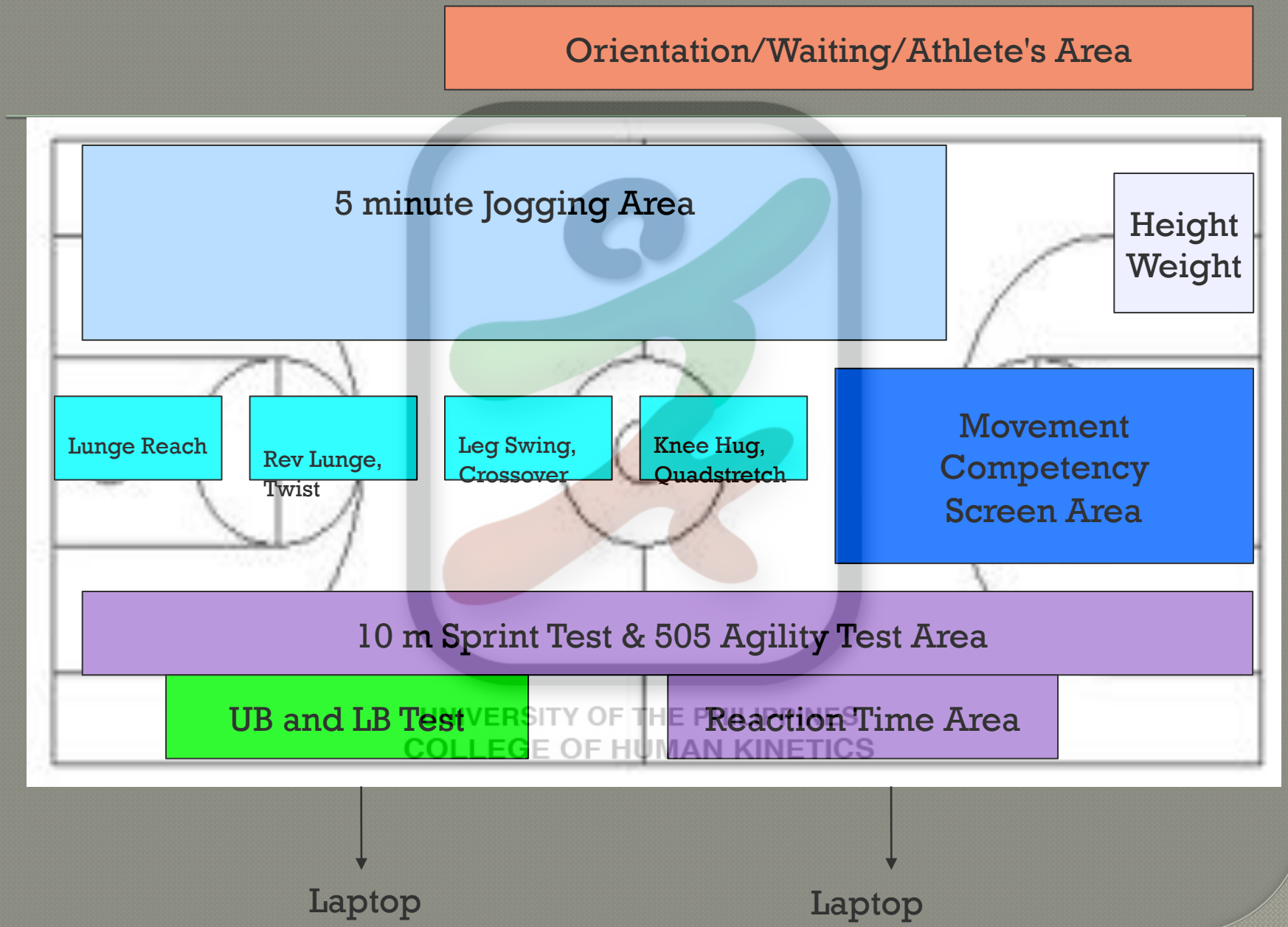
UPDCHK ESL Chronojump-Boscosystem Project



2. European Model (Slovenia)

A. Arm Plate Tapping – Speed of Alternative Movement
B. Standing Broad Jump – Explosive power
C. Polygon Backwards – Coordination of Body Movements
D. Sit-ups – Trunk Muscle Strength
E. Forward Bend and Touch on the Bench – Flexibility
F. Bent Arm Hang – Muscular Endurance of the Shoulder
G. 60-Meter Run – Speed
H. 600-Meter Run – General Endurance

3. U.P. College of Human Kinetics Sports Readiness Test (Entry Point to the Degree Programs of CHK – CSS, BPE, BSS)

A. Bio-Electrical Impedance Analysis – % Body Fat
B. Movement Competency Screen – Joint Mobility and Stability
C. Standing Long Jump – Lower Body Strength
D. Illinois Agility Run - Agility
E. Balance Beam Walk - Balance
F. Hand and Eye Coordination Test – Coordination
G. Softball Throw – Power
H. 50-Yard Dash - Speed
E. 1 min-Step Test – Cardiovascular Endurance

- Future Projects of CHK – Fitness test for the Philippine National Police Personnel (140,000)

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