**SKILL in SPORTS**

Exercise: What is Skill? Define Skill in your own words....

The ability to perform physical or mental tasks with a maximum degree of success

Technique – ability to perform and action..

Skill – when a technique can be performed in a game or stressful environment

Name several varying types of skills..

How do we acquire Skill?

Repetition of Correct technique an application in game situations..

What do we have to do to gain more skill?

Types of Skills:

**MOTOR SKILLS:** Involves Muscular Movement and Muscular Co-ordination

Name some Motor Skills...

**COGNITIVE SKILLS:** Involves thinking and Decision Making

Name some Cognitive Skills...

**PERCEPTUAL SKILLS:** “Reading the Game” assessing situations including all senses, including senses....

intuitive Name some Perceptual Skills....

**PERCEPTUAL MOTOR SKILLS:** A combination of the above where the athlete interprets environmental stimuli and makes motor responses based on this information...

Name some perceptual Motor Skills....

Skills can be further defined and categorized in several different ways:

**Movement Categories:**

Discrete............................Serial......................Continuous

Serve Birdie.........................Tumbling......................cycling
Environmental Categories:

Open........................................................................................................................................Closed

Catching Rebound...................................................................................................................Archery

Size of Musculature Categories:

Gross Motor Skills.......................................................................................................................Fine Motor Skills

Large muscle groups..................................................................................................................Smaller Muscle Groups

( jumping) ....................................................................................................................................(playing piano)

Interaction Categories:

Individual.................................................................................................................................Coactive.............................................................................................................................Interactive

Discus..............................................................................................................................relay race/tandem cycling.........................................................Rugby

ABILITY:

Abilities are traits that we are born with. They give us the capacity to perform skills.

Some people are born with higher level Motor abilities than others, which make them faster runners and more explosive than others. Some people are born with higher levels of perceptual ability to recognize situations when they occur in sports and some have higher levels of motor co-ordination. We can always improve our abilities to some extent, with correct training.
The Researcher Edwin Fleishman, analyzed Ability and came up with a table of both Perceptual-Motor and Physical Abilities.

From page 112, list these Abilities and try to give an example in Sports and Exercise...

<table>
<thead>
<tr>
<th>Perceptual- Motor</th>
<th>Example</th>
<th>Physical Ability</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Precision</td>
<td>Quarterback, pitching</td>
<td>Static Flexibility</td>
<td>Gymnastic/skating pose</td>
</tr>
<tr>
<td>Multi-Limb Co-ordination</td>
<td>Swimming, diving</td>
<td>Dynamic Flexibility</td>
<td>Soccer/hockey goalie</td>
</tr>
<tr>
<td>Response Co-ordination</td>
<td>Point guard, running back</td>
<td>Static Strength</td>
<td>Wrestling</td>
</tr>
<tr>
<td>Pure Reaction Time</td>
<td>Catcher returning birdie</td>
<td>Dynamic Strength</td>
<td>Pole vault, running back</td>
</tr>
<tr>
<td>Speed of Arm Movement</td>
<td>First base, tennis,</td>
<td>Explosive Strength</td>
<td>Dunking, shot put, linebackers</td>
</tr>
<tr>
<td>Rate Control</td>
<td>Team cycling</td>
<td>Trunk Strength</td>
<td>Rowing</td>
</tr>
<tr>
<td>Manual Dexterity</td>
<td>Typing, piano</td>
<td>Gross Body Coordination</td>
<td>Boxing and jump roping swimming</td>
</tr>
<tr>
<td>Arm-Hand Steadiness</td>
<td>Archery, shooting</td>
<td>Gross Body Equilibrium</td>
<td>Gymnastics wide receiver</td>
</tr>
<tr>
<td>Wrist Finger Speed</td>
<td>Badminton, ping pong</td>
<td>Stamina</td>
<td>Track, marathon</td>
</tr>
<tr>
<td>Aiming</td>
<td>Bowling, curling, archery,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postural Discrimination</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response Integration</td>
<td>Quarterback, point guard</td>
<td></td>
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</tr>
</tbody>
</table>

Discuss the use of “Raw Ability” in the selection of children for the Eastern Bloc sports schools during the “cold war”

http://www.dctkd.org/library/papers/olympics/east_germany.cfm

How are skills and ability related?

SKILL = ABILITY + THE SELECTION OF THE CORRECT TECHNIQUE (IN A GAME SITUATION)
What are the characteristics between Skilled and Novice performers?

Skilled? Smooth, effortless, confident, efficient, consistent

Novice? Jerky, inconsistent, uncertain, awkward, uncoordinated

**Information Processing:**

Classroom Activity: Take a Sports Skill that you are familiar with and break down the entire skill from stimulus to final action. Eg. Receiving a Tennis Serve.

Important Concepts in Information Processing that lead to a skill being performed:

**Input** – involves Sensation or sensory input

- Exteroceptors (external signals) and Interoceptors (internal signals)

**Perception** of Signals - precursors to decision making....(eg. soccer player looking up before the shot, may signal the goalie to be ready for a shot)

- “Noise” nonessential information (spectators, movement etc..)

- Examples of Signal detection in everyday life? Traffic lights etc....

- Opposite effect would be “camouflage”

**Decision** - how to approach intended skill - the moment at which you decide which skill to use. Eg. A quarterback selecting which receiver to throw to...

**Efferent Organization** – body’s motor readiness to perform skill - motor readiness, body is physiologically preparing to make an imminent action.

**Output** The skill actually being performed
Notes on Memory:

Short Term Memory – we can remember 7+-2 pieces of Information

Give class 12 numbers - how many can you recall in order?

“Chunking” – learning skills and data in groups

- then give the class 12 numbers and ask them to remember them in groups of 4
- Give examples of chunking in sports learning – (eg Tennis serve)

Selective Attention – dealing with just one aspect – ignoring others (BB free throws, putting in a big crowd)

Long Term Memory - no capacity limitations

Response Time:

The time from the introduction of a stimuli to the completion of the action...

Can we improve our reactions? 2 soccer/tennis ball experiment - record success rate improvement

Hold two soccer balls palm up shoulder height in front of your partner.

- Suddenly drop one ball – can your partner catch it before it hits the ground
- Did this skill improve with time?
- Can you hotwire a neural circuit to perform a skill more efficiently?

Sheep Dash - record results over 10 minutes.....

Record numerical scores...over 5 minutes

Construct a Simple Graph to show progress.....

<table>
<thead>
<tr>
<th>Time</th>
<th>Trial Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Factors Determining Response Time:

- Reaction Time
- Reception Time (sensory Perception)
- Decision Time (involves STM and LTM info)
- Efferent Organization
- Motor Time

How do our reactions change as we age, from childhood to old age...?

- Reactions increase to thirties and then level off and then decline...

Number of Choices we have? The more choices we have the slower our Reaction Time

Do Tennis Ball experiment with one Ball now.... With Three

What’s the effect of adding balls?

**(Hick’s Law – Reaction Time increases every time the Stimuli are doubled)**

http://www.youtube.com/watch?v=rzz-NxGpQh4 Sensory information in Ping Pong

- auditory Stimuli 0.03 second faster that visual stimuli therefore a top Ping pong player relies on the visual and auditory signals to return a smash.

- 0.11 Table Tennis champion reaction time

http://www.youtube.com/watch?v=P4PrTKwqeHY Jerry Rice Tennis Balls

- Reaction time slower with two balls coming in rapid succession
  - Second stimuli slows reactions down...

- With no previous experience of this exercise, Chad Johnson a wide receiver in the NFL beat out an MLS Goalie, and an NBA player

http://www.youtube.com/watch?v=rrVCWddQHN8 Larry Fitzgerald
- Sensory information re flight of the ball was not present as the athlete was upside down...no previous cue from LT Memory
- Average start time of line of scrimmage reaction was 0.32 – Larry F was 0.16
  - This equates to one yard of separation from defensive back.

[http://www.youtube.com/watch?v=FrZVRuK77EE] Blink vs. a Pitch

- Pitch is 0.395 seconds and Blink 0.4 seconds..

[http://www.youtube.com/watch?v=CXpoWf3V1bQ] Cat vs. Hockey Goalie

- NHL goalie reacted at 0.1 second to a puck fired 25 feet away at 81 miles and hour

[http://www.youtube.com/watch?NR=1&feature=endscreen&v=ElcVDyV77c] Peripheral Vision effects Reaction Time

- Top Athletes have better peripheral vision, therefore can react faster to stimuli than the average athlete
- Possibly great density of cones located in the eye (cones are responsible for detecting movement)

The Psychological Refractory Period:

A researcher named Welford discovered that Reaction Time was slower if a second stimuli was introduced right after the first stimuli.

We call this “selling a dummy” or “feinting” in sports. The first Stimuli is the dummy and the second is the actual action.

Give examples of the Psychological Refractory Period in Sports.

Refer to Page 119 and 120 of Text: Summarize the sections of Motor Programs....

Tap Head while rubbing stomach....

Explain Key Points: Open Loop vs Closed Loop

Open Loop – no feedback incorporated in skill: Dodging a Punch
Closed Loop – skill performed with the use of feedback – adjustments possible – *chasing down a drop volley in tennis and deciding which shot to return*

Schmidt’s Schema theory: Recall vs. Recognition

Recall: skill based on memory allowing automatic action response

Recognition: skill that can be changed in response to the feel of the situation

**Feedback:**

Information that results from an action or a response.....

**Extrinsic and Intrinsic**

**Extrinsic Feedback** – usually given by a coach, teammate or by a stopwatch or tape measure..for example : “ nice looking backhand!”

**Intrinsic Feedback** – feedback received from self as a result of the action - and the “feel” of the action. “That jump shot felt good when it left my hands”,

This feedback can in come in to forms:

- **Knowledge of Results** (eg. what was my score?) **KR**
- **Knowledge of Performance** (eg. how was my technique?) **KP**

So when a long jumper completes a jump he/she wants to know “how far did I jump?” (KR)

...and then might ask the coach “how was my technique/” (KP)

Knowledge of Performance can be very effective when in the form of Video or film (Hudl)

What types of Feedback are most helpful?

Discussion.....

Positive Feedback – example... “great job – I like the way that shot looked”

Or Negative Feedback – example... horrible shot, nothing was right about it”

Or Prescriptive (Constructive/Instructive Feedback) – example –... “quite good but remember to lock your ankle”

Should there be a difference in Feedback between Beginners and Advanced performers?

Beginners need what type of feedback? ... Positive and Instructive – verbal and non-verbal...
Can Praise be overdone? .. If given too much it loses its effectiveness................

Can correct feedback lead to greater Motivation? ...yes – if the learner is motivated, they learn faster and more effectively

**Performance vs. Learning?**

*Performance*: a temporary level of skill fluctuating from time to time

*Learning* (a learned skill): a relatively permanent change in performance...

**How we Learn:**

http://www.youtube.com/watch?v=_wHkA_983_s

Great Performers….an ongoing Debate. How do great performers become great? How do they develop incredible levels of skill?

**Matthew Syed**: Bounce: Genetics vs. Environment

“Greatness is NOT born - it is made”

Traits: Time Practicing – Excellent Coaching – Great Effort Every Day (tied to Motivation)

http://www.youtube.com/watch?v=I1K6bOG8mj8

**Daniel Coyle**: The Talent Code:

“deep practice” cements the growth of Myelin coated Neural Pathways which are “hotwired skill circuits”…. Practice is focused and deliberate with multiple instances of instructive feedback

(eg. A John Wooden Training practice.. )

http://www.youtube.com/watch?v=dY7QNxBziA

**Carol Dweck**: Mindset – how Mindset effects Learning

- Growth Mindset vs. a Fixed Mindset
- Implications for Teachers, Parents and Coaches
- Praising Great Effort vs. Talent

http://www.youtube.com/watch?v=aPNeu07I52w

**Class Discussion**: on how we learn.....based on the three theories above, how would you go about developing skill? Either in yourself or a group you coach?
Learning a Physical Skill:

http://www.youtube.com/watch?v=4kTUrqx1PG8

http://www.youtube.com/watch?v=atDzRu7oSHg

**Cognitive Stage:** The learner is gaining a mental or intellectual **understanding** of what is required to perform the skill. *What to do...* An explanation and a demonstration is useful here as well as coaching points to help direct the learner.

**Associative Stage:** In this stage the learner focuses in on Practice, and refining/honing the skill that is being learned. Trial and Error, failure and successes, intrinsic and extrinsic feedback, all contribute to the learning curve here.

**Autonomous Stage:** Conscious thought is not necessary to perform the skill at hand.

An advanced level of performance where the skill is performed automatically, fluently, instinctively.

**Learning Curves:**

We often hear in sports about “it s going to be a steep learning curve for……”

Read about learning curves on Page 122 and then, using the information from Figure 5.11 give a sport/exercise example of the following learning curves:

a) A linear
   - Relatively steady improvement rate
   - Skating, typing, skateboarding, basketball,

b) **Positive accelerated**
   - Slow improvement to start with rapid improvement following
   - Juggling, learning how to swim, learning how to ride a bike

c) **Negatively accelerated**
   - Rapid improvement then steadying off
   - Weight training, lacrosse, sprinting
d) A Plateau effect
- Improvement then period of no improvement, the more improvement
- Golf, Frisbee,

**Motivation:**

**Motivation:** Michael Jordan Wisdom: [http://www.youtube.com/watch?v=gfvuF5qf9v0](http://www.youtube.com/watch?v=gfvuF5qf9v0)

Motivation is a KEY consideration in the success of learning a skill because it defines WHICH activity we choose to do, how INTENSELY we work at the activity and how LONG we will practice that activity.

So Motivation explains why we play and practice – our motives:

Our motives could be **INTRINSIC:** It is FUN, it makes us FEEL GOOD, it makes feel FITTER and STRONGER, and we enjoy the INTERACTION and COMPETITION aspects. It also enhances feeling of SELF WORTH.

Or motives could also be **EXTRINSIC:** We do it for SOCIAL RECOGNITION, to WIN PRIZES, to get PRAISE from others, or to get a LABEL (such as “Varsity” or to get name in the local paper)

Extrinsic Motivation can lose its power over time, and enjoyment of the actual activity can decrease if that is the only motivation at play.

Give examples of Intrinsic and Extrinsic Motivation that you have experienced in sports....

**Transfer of Training:**

**Positive Transfer:** when the skill and knowledge of one skill helps the learning of a related skill

Examples? Basketball-Football, switch hitting in Baseball, Throwing a Baseball-throwing a javelin, punt a football-punting a rugby ball, shooting left handed-shooting right handed, Pitching machine – live pitching,

**Negative Transfer:** When the skill and knowledge of one skill inhibits the learning of a related skill

Examples? Tennis – Badminton, Football-Rugby, Tennis-Ping Pong, Baseball-Cricket, Basketball-volleyball,

**Practical Demonstration:**

Take an established Baseball/softball player and throw 10 balls at him/her to the weak hand
Do the same with a non Baseball/softball player. What are the results?
Summarize results:

Experienced Baseball player caught 10 straight w/ left glove and right glove (even though he was right handed) **TRANSFER of TRAINING from left to right hand**

Less experienced Baseball player (played - owned left hand glove) scored 9/10 on left hand and 4 of ten on right hand (where he was least experienced at catching) - **NO TRANSFER of TRAINING from left to right hand**

No experience in baseball whatsoever did better on the right hand glove, as they were right handed  **TRANSFER of TRAINING (from other forms of catching to baseball catching)**

Theories of Practice:

**Basic Premise:** Practice is essential to acquiring motor skills

However – Practice must affect learning.....Can you think of instances where practice does not affect learning?

The Process of Practice involves some modeling of the skill (demonstration), the development of motor programs through repetition, trial and error, feedback and correction

**Massed Practice vs. Distributed Practice (Intervals between practice)**

**Massed Practice:** continuous repetition of the skill at hand with very little gap between attempts. Eg. Shooting baskets for 45 minutes straight

**Distributed Practice:** practice periods broken up by periods of a different activity.

Eg. Shooting Baskets, lay-up practice, shooting baskets, scrimmaging

**Blocked, Random or Serial Practice session (order of Practice)**

**Blocked Practice** – repetition of a movement over and over again. Example five sets of 10 jump shots. Or three sets of 10 low hand saves for a soccer goalie.

**Random Practice** – movements are randomly practiced with the practice of other moments. Example at a practice when practicing trapping – balls may come on the ground or in the air requiring different skill sets.

**Serial Practice** – movements are practiced in consistent order. Example, in Volleyball, dig, set spike,
**Task Presentation:**

Generally speaking when teaching a skill it is important to:

- Show the entire skill several times (demo) or watch video
- Explain why the skill is important or necessary
- Show different parts of the entire skill

**Presentation Techniques:**

**Whole skill practice:**

Just practice the entire skill – best for rapid complex skills such as golf swing or batting practice. Skill could be slowed down to ensure technique is correct

**Whole – Part- Whole Practice:**

Try whole skill, then isolate different parts in consecutive order, then try whole skill again. Example – a badminton serve. Try whole serve. Then Practice initial stance – practice backswing – practice contact and follow through – then Practice whole serve again.

There is a lot of debate as to which method is more effective. One theory is that the whole method is better for teaching skills that occur in an open environment when decision making skills also come into play. For example, there is a saying in soccer that “the game is the best teacher”. This is taken to mean that by scaling the game down to smaller sided scrimmages, the players will learn to perform the skill at the appropriate moment.

Another theory suggests that breaking down a technique is important before trying the skill in a game situation. Then the technique is subjected to “stress” (eg. A passive defender, or a smaller area in which to operate),before moving to game like pressure situations.
Practical: Most effective types of practice (Whole vs. Whole – Part - Whole method)

Group into three: One expert and two novices. Two types of practice, one each for the novices.

Badminton serve: Isiah – Katy- Lennart
Basketball Lay-up: Robert – Abbey - Molly
Weak hand throw through hoop from 30 feet: Ian – Eric - Jesse
Soccer Dribble though cones: Klaas – Chris – Jamir

Stage 1: Planning. Date –list equipment – location – record keeping – video?
Stage 2: Implementation:

Demo Skill (at least 6 times)
Stage 3: Whole skill attempts – Cognitive Stage – note success
Stage 4: Practice Protocol –

One novice do “Whole Practice” (blocked)
One novice do “Whole – Part – Whole”
Stage 5: Novice attempt skill attempts a second time - video?
Stage 6: Note any skill improvement -