MIND GAMES
VIEW FROM THE TOP
60-SECOND SUMMARY
HOT OFF THE PRESS
DIRECTORY

OLYMPIC COACH

FALL 2008 • VOLUME 20 • NUMBER 4

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FEATURES

DEPARTMENTS

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ON THE COVER
Cover Photos Left to Right:
Gymnastics- Shawn Johnson by Cameron Spencer
Hope Solo, Coach Pia Sundhage and Natasha Kai by Lars Baron
High Jumper- Jeff Skiba by Chris Hyde
Swimming-Aaron Piersol, Brendan Hansen and Michael Phelps by Ezra Shaw
Wrestling- Henry Cejudo by Jed Jacobsohn
MVB- Clayton Stanley, David Lee and Riley Salmon by Cameron Spencer
Fencing- Sada Jacobson, Mariel Zagunis and Becca Ward by Clive Brunskill
Discus- Stephanie Brown Trafton by Stu Forster

Message from the
PERFORMANCE SERVICES MANAGING DIRECTOR
by
DOUG INGRAM

How can you describe the 2008 Beijing Olympic Games? Spectacular, stunning, amazing—I am not sure that there are enough adjectives to use. Someone described it as a Super Bowl everyday. The performances of America's finest truly held up to Amazing Awaits.

110 medals—36 Gold, 38 Silver, 36 Bronze

We enjoyed seeing some athletes surprise us with their outstanding performances and were saddened for some who narrowly missed their goals. We were exhilarated by come from behind victories and touched by personal tragedy. Every Games has a different atmosphere and attitude—they are never the same. China and the Chinese people (the thousands of remarkable volunteers) provided an atmosphere that may never be duplicated.

We asked our Performance Services staff to list their top memorable moment of the Games:

- ★ Women's Sabre team sweeping the podium—remarkable considering in 2004, Fencing broke a 100 year old drought with a Gold medal in Women's Sabre;
- ★ Michael Phelps (8 Gold medals four individual world records and three relay world records), fighting to the finish in the 100 meter Butterfly;
- ★ The Lopez family (Mark, Steven, Diana) all winning medals in Taekwondo;
- ★ Women's Soccer—a team that was struggling in pool play (who had lost several key player and one just two weeks prior to the Games), playing one of the dominant teams in the world and with dogged determination winning the Gold;
- ★ The surprise winning of a Gold Medal in Women's Discus by Stephanie Brown-Trafton after a 56 year medal hiatus in that event;
- ★ The determination of Jason Lesak's come from behind relay leg to win the gold for the USA and keep Michael's string alive.
- ★ Misty May and Kerri Walsh winning a nail-biter of a match against the Chinese team of Jia and Jie (21-18, 21-18);
- ★ Henry Cejudo, a naturalized American citizen from Mexico, winning the Gold in Freestyle Wrestling (55kg);
- ★ Women's Volleyball performance against the Chinese (in perhaps the loudest venue of the Games) as their coach Lang Ping, who was the star of the 1984 Olympic Games for the Chinese turned the tables on her former nation;
- ★ The herculean come-from-behind victories(12 straight points) of Keeth Smart in the Men's Team Sabre match against Russia and Hungary to advance the team to the gold medal bout;
- ★ Men's Water Polo fighting back against Hungary with every thing they could throw and finishing with Silver;
- ★ The Men's Gymnastics team capturing Bronze after losing three members of the team to injury and having been ranked 13th in the World two years ago;
- ★ Lolo Jones handling the disappointment of losing the Gold (when she hit the final hurdle) with the class of a champion;

The most inspirational performance was that of the Men's Volleyball team, who handled the adversity of the tragic death of the coach's father-in-law and his inability to be with the team. They showed the world what real teamwork was about by defeating the Brazilian team with five edge of your seat games.

PARALYMPIC GAMES

The Chinese did another masterful job in hosting the Paralympic Games—the pageantry of the Opening Ceremonies was matched with the flawlessness of the competitions. The capacity crowds were treated to amazing performances as the Chinese dominated the medal count with the US finishing third in the overall count.

USA Paralympic Team finished with 99 total medals- 36 Gold-35 Silver- 28 Bronze

Memorable Paralympic Moments

- ★ Five-time Paralympian Barbara Buchan's Gold Medal in Cycling Individual Pursuit, after being injured in a cycling accident in 1982;
- ★ Women's Wheelchair Basketball team dominating the Games going without a loss;
- ★ The "Twins of Swim"- Erin Popovich (4 Gold, 2 Silver) and Jessica Long (4 Gold and 2 Bronze) leading the way to US winning the medal count in Swimming;
- ★ April Holmes surviving a fall and collision in the 200 meters (that resulted in six stitches on her eyebrow) to comeback and win the 100 meters;
- ★ The tennis doubles team of Nick Taylor and David Wagner winning the Gold in the Quad Wheelchair division.

We hope that each of you had your own special Olympic/Paralympic moment or even better many special moments.

In this issue, you will find the Honor Roll of Coaches who received the Order of Ikkos. Dick Schmidt, one of the leaders in Motor Learning has contributed an article on Principles of Practice. Dick will be presenting in Colorado Springs on November 13-14th at the Development, Enhancement and Sustainability of Expert Performance in Sport Seminar (more details in Hot off the Press). Julie Dunn tells us about her experiences with athletes and their learning preferences. We have started a series on Legal Issues with Dr. Athena Yiamouyannis. The first article is on the hot topic of negligence.

Technology is every changing and Scott Riewald gives us an up-to-date discussion on the use of Global Positioning Systems (GPS). Heidi Thibert from Figure Skating provides us with some insights on how to develop a Coaching Philosophy. Super foods for the Fall and a 60 second summary looking in to feedback research, round out this edition of Olympic Coach magazine.

Enjoy!

THE ORDER OF IKKOS

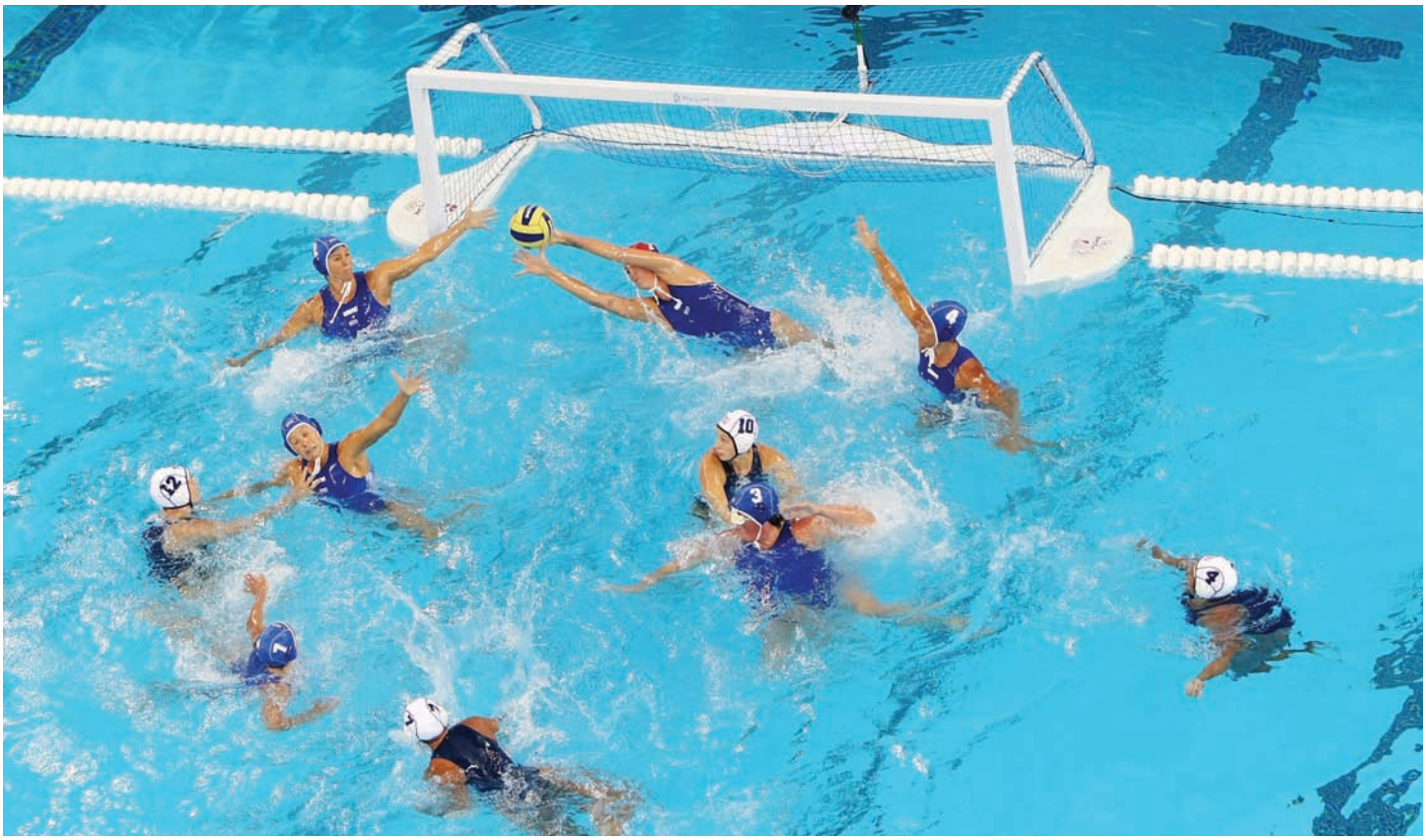
HONOR ROLL OF COACHES

The USOC is proud to recognize the efforts of America's finest coaches with the Order of Ikkos. The medallion awarded is a symbol of excellence in Coaching as represented by the athletes' achievement as an Olympic or Paralympic Medalist. The list below represents countless hours of training America's athletes to achieve the dream of an Olympic medal.

2008 OLYMPIC GAMES- BEIJING, CHINA				
Sport	***Event Final***	***Athlete Name***	***Personal Coach***	***Finish***
Athletics	200m- Women	Allyson Felix	Bob Kersee	Silver
Athletics	400 Hurdles- Men	Kerron Clement	Bob Kersee	Silver
Athletics	100m Hurdles-Women	Dawn Harper	Bobby Kersee	Gold
Athletics	200m- Men	Shawn Crawford	Bobby Kersee	Bronze
Athletics	Shot Put-Men	Christian Cantwell	Brett Halter	Silver
Athletics	110m Hurdles	David Oliver	Brooks Johnson	Bronze
Athletics	4 x 400 Relay- Men		Bubba Thornton	Gold
Athletics	400m - Women	Sanya Richards	Clyde Hart	Bronze
Athletics	400m- Men	LaShawn Merritt	Dwayne Miller	Gold
Athletics	400 Hurdles- Men	Bershawn Jackson	George Williams	Bronze
Athletics	400 Hurdles- Men	Angelo Taylor	Innocent Ebgunike	Gold
Athletics	4 x400 Relay- Women		Jeannette Bolden	Gold
Athletics	10,000 m- Women	Shalane Flanagan	John Cook	Bronze
Athletics	400m- Men	David Neville	John Smith	Bronze
Athletics	400 Hurdles- Women	Sheena Johnson-Tosta	Joseph Tosta	Silver
Athletics	Decathlon	Bryan Clay	Kevin Reid	Gold
Athletics	Heptathlon	Hyleas Fountain	Lynn Smith	Silver
Athletics	110m Hurdles	David Payne	Maurice Pierce	Silver
Athletics	400m- Men	Jeremy Wariner	Michael Ford	Silver
Athletics	Pole Vault-Women	Jenn Stuczynski	Rick Suhr	Silver
Athletics	Discus- Women	Stephanie Trafton Brown	Robert Budke	Gold
Athletics	100m- Men	Walter Dix	Terry Long	Bronze
Athletics	200m- Men	Walter Dix	Terry Long	Silver
Baseball	Men's Team		Davey Johnson	Bronze
Basketball	Women's Team		Anne Donovan	Gold
Basketball	Men's Team		Mike Krzyzewski	Gold
Beach Volleyball	Men's Team	Dalhausser and Rogers	Robert Alejo	Gold
Beach Volleyball	Women's Team	Walsh and May-Treanor	Troy Tanner	Gold
Boxing	91kg	Deontay Wilder	Jay Deas	Bronze
Cycling	BMX-Women	Jill Kinter	Greg Romero	Bronze
Cycling	Individual Time Trial	Kristin Armstrong	Jim Miller	Gold

Sport	*Event Final*	*Athlete Name*	*Personal Coach*	*Finish*
Cycling	Individual Time Trial	Levi Leipheimer	Max Testa	Bronze
Cycling	BMX- Men	Donny Robinson	N/A	Bronze
Cycling	BMX- Men	Mike Day	N/A	Silver
Equestrian	Jumping Individual	Beezie Madden	N/A	Bronze
Equestrian	Individual Eventing	Gina Miles	N/A	Silver
Equestrian	Jumping Team		George Morris	Gold
Fencing	Sabre-Women	Sada Jacobsen	Arkady Burdan	Bronze
Fencing	Sabre- Women	Becca Ward	Ed Korfanty	Silver
Fencing	Sabre-Women	Mariel Zagunis	Ed Korfanty	Gold
Fencing	Team Sabre- Women		Ed Korfanty	Bronze
Fencing	Team Foil- Women		Michael Pederson	Silver
Fencing	Team Sabre- Men		Yury Gelman	Silver
Gymnastics	Men's Team		Kevin Mazeika	Bronze
Gymnastics	All-Around- Women	Shawn Johnson	Liang Qiao	Silver
Gymnastics	Floor Exercise- Women	Shawn Johnson	Liang Qiao	Silver
Gymnastics	Beam- Women	Shawn Johnson	Liang Qiao	Gold
Gymnastics	Women's Team		Liang Qiao	Silver
Gymnastics	Horizontal Bar- Men	Jonathan Horton	Mark Williams	Silver
Gymnastics	All-Around- Women	Nastia Liukin	Valeri Liukin	Gold
Gymnastics	Floor Exercise- Women	Nastia Liukin	Valeri Liukin	Bronze
Gymnastics	Uneven Bars- Women	Nastia Liukin	Valeri Liukin	Silver
Gymnastics	Beam- Women	Nastia Liukin	Valeri Liukin	Silver
Judo	70k Women	Ronda Rousey	Jimmy Pedro	Bronze

Sport	Event Final	Athlete Name	Personal Coach	Finish
Rowing	Single Sculls	Michelle Guerette	Charlie Butt	Silver
Rowing	Eights-Men		Mike Teti	Bronze
Rowing	Eights- Women		Tom Terrhaar	Gold
Sailing	Finn	Zach Railey	Kenneth Andreasen	Silver
Sailing	Laser Radial	Anna Tunnicliffe	N/A	Gold
Shooting	Skeet- Men	Vincent Hancock	Craig Hancock	Gold
Shooting	Men's Double Trap	Walton Eller	Danny Carlisle	Gold
Shooting	50m Rifle Prone	Matthew Emmons	Dave Johnson	Silver
Shooting	Trap- Women	Corey Cogdell	Lloyd Woodhouse	Bronze
Shooting	Skeet- Women	Kim Rhode	Richard Rhode	Silver
Shooting	10m Air Pistol- Men	Jason Turner	Sergey Luzov	Bronze
Soccer	Women's Team		Pia Sundhage	Gold
Softball	Women's Team		Mike Candrea	Silver
Swimming	400 IM Final- Men	Michael Phelps	Bob Bowman	Gold
Swimming	200m FS- Men	Michael Phelps	Bob Bowman	Gold
Swimming	200m Butterfly	Michael Phelps	Bob Bowman	Gold
Swimming	100m Butterfly- Men	Michael Phelps	Bob Bowman	Gold
Swimming	200m Ind. Medley-Men	Michael Phelps	Bob Bowman	Gold
Swimming	200m FS- Men	Peter Vanderkaay	Bob Bowman	Bronze
Swimming	400 M Freestyle-Men	Larsen Jensen	Dave Salo	Bronze
Swimming	100m Breaststroke	Rebecca Soni	Dave Salo	Silver
Swimming	200m Breaststroke- Women	Rebecca Soni	Dave Salo	Gold
Swimming	100m Backstroke- Men	Aaron Piersol	Eddie Reese	Gold
Swimming	200m Backstroke- Men	Aaron Piersol	Eddie Reese	Silver
Swimming	4 x100 Freestyle- Men		Eddie Reese	Gold
Swimming	4 x 200m FS Relay-Men		Eddie Reese	Gold
Swimming	4 x 100 Medley Relay-Men		Eddie Reese	Gold
Swimming	100m Backstroke- Men	Matt Grevers	Frank Busch	Silver
Swimming	400 IM Final- Men	Ryan Lochte	Greg Troy	Bronze
Swimming	200m Backstroke- Men	Ryan Lochte	Greg Troy	Gold
Swimming	200m Ind. Medley-Men	Ryan Lochte	Greg Troy	Bronze
Swimming	4 x100 Freestyle- Women		Jack Bauerle	Silver
Swimming	4 x 200m FS Relay-Women		Jack Bauerle	Bronze
Swimming	4x 100 Medley Relay-Women		Jack Bauerle	Silver
Swimming	100m Freestyle	Jason Lezak	Jeff Julian	Bronze
Swimming	100 Butterfly- Women	Christine Magnuson	Matt Kredich	Silver
Swimming	50m Freestyle-Women	Dara Torres	Michael Lohberg	Silver
Swimming	400 IM Final- Women	Katie Hoff	Paul Yetter	Bronze
Swimming	400 Freestyle-Women	Katie Hoff	Paul Yetter	Silver
Swimming	100m Backstroke-Women	Margaret Hoelzer	Sean Hutchinson	Bronze
Swimming	200m Backstroke- Women	Margaret Hoelzer	Sean Hutchinson	Silver
Swimming	100m Backstroke-Women	Natalie Coughlin	Teri McKeever	Gold



Sport	*Event Final*	*Athlete Name*	*Personal Coach*	*Finish*
Swimming	200m Ind. Medley- Women	Natalie Coughlin	Teri McKeever	Bronze
Swimming	100m Freestyle-Women	Natalie Coughlin	Teri McKeever	Bronze
Taekwondo	57kg- Women	Diana Lopez	Jean Lopez	Bronze
Taekwondo	68kg- Men	Mark Lopez	Jean Lopez	Silver
Taekwondo	80kg-Men	Steven Lopez	Jean Lopez	Bronze
Tennis	Doubles- Women	Serena and Venus Williams	Richard Williams	Gold
Tennis	Doubles-Men	Bob and Mike Bryan	Rodney Harmon	Bronze
Volleyball	Men's Team		Hugh McCutcheon	Gold
Volleyball	Women's Team		Lang "Jenny" Ping	Silver
Water Polo	Women's Team		Guy Baker	Silver
Water Polo	Men's Team		Terry Schroder	Silver
Wrestling	63 kg Freestyle- Women	Randi Smith	Levi Weikelmagden	Bronze
Wrestling	Greco-Roman-96kg	Adam Wheeler	Steve Fraser	Bronze
Wrestling	55kg Freestyle-Men	Henry Cejudo	Terry Brands	Gold

2008 PARALYMPIC GAMES- BEIJING, CHINA

Sport	*Event Final*	*Athlete Name*	*Personal Coach*	*Finish*
Archery	Men's Ind. Compound- W1	Jeff Fabry	Randi Smith	Bronze
Archery	Women's Ind. Recurve	Lindsay Carmichael	Ron Carmichael	Bronze
Athletics	4 x 100 Relay-W T53		Adam Bleakney	Bronze
Athletics	400m T53	Anjali Forber-Pratt	Adam Bleakney	Bronze
Athletics	400m T53	Jessica Galli	Adam Bleakney	Gold

Sport	Event Final	Athlete Name	Personal Coach	Finish
Athletics	100m T53	Jessica Galli	Adam Bleakney	Silver
Athletics	200m T53	Jessica Galli	Adam Bleakney	Silver
Athletics	800m T53	Jessica Galli	Adam Bleakney	Bronze
Athletics	100m T53	Josh George	Adam Bleakney	Gold
Athletics	800m T53	Josh George	Adam Bleakney	Bronze
Athletics	5000 m T54	Amanda McGrory	Adam Bleakney	Gold
Athletics	Marathon T54	Amanda McGrory	Adam Bleakney	Silver
Athletics	800m T53	Amanda McGrory	Adam Bleakney	Bronze
Athletics	100m T44	April Holmes	Al Joyner	Gold
Athletics	100m T44	Jerome Singleton	Curtis Frye	Silver
Athletics	Pentathlon	Jeremy Campbell	Darcy Ahner	Gold
Athletics	Long Jump- F-11	Elexis Gillette	Darcy Ahner	Silver
Athletics	High Jump- F44-46	Jeff Skiba	Darcy Ahner	Gold
Athletics	Pentathlon	Jeff Skiba	Darcy Ahner	Silver
Athletics	Long Jump- F42-44	Casey Tibbs	Darcy Ahner	Bronze
Athletics	Discus Throw	Jeremy Campbell	Joaquim Cruz	Gold
Athletics	800m T13	Peter Gottwald, Jr.	Joaquim Cruz	Silver
Athletics	100m T12	Josiah Jamison	Joaquim Cruz	Gold
Athletics	400m T44	Jim Bob Bizell	N/A	Silver
Athletics	200m T44	Jim Bob Bizell	N/A	Silver
Athletics	200m T54	Tatyana McFadden	Peter Eriksson	Silver

Sport	Event Final	Athlete Name	Personal Coach	Finish
Athletics	400m T54	Tatyana McFadden	Peter Eriksson	Silver
Athletics	800m T54	Tatyana McFadden	Peter Eriksson	Silver
Athletics	4 x 100 Relay-M T42-46		Troy Engle	Gold
Athletics	100m T44	Brian Frasure		Bronze
Basketball	Women's Team		Ron Lykins	Gold
Cycling	Ind. Pursuit (B/VI)- W	Whitsell and Woodring	Craig Griffin	Bronze
Cycling	Ind. Time Trial (B/VI) W	Whitsell and Woodring	Craig Griffin	Gold
Cycling	Ind. Road Race (B/VI) W	Whitsell and Woodring	Craig Griffin	Silver
Cycling	Ind.Time Trial LC3-4/CP3	Allison Jones	Craig Griffin	Silver
Cycling	Ind. Road Race HC-C	Alejandro Albor	Jim Lehman	Silver
Cycling	Ind. Time Trial HC-C	Alejandro Albor	Jim Lehman	Bronze
Cycling	Ind. Time Trial LC4	Anthony Zahn	Jim Lehman	Bronze
Cycling	Ind. Time Trial LC3-4/CP3	Barbara Buchan	Justin Wadsworth	Gold
Cycling	Ind. Time Trial HC-C	Oz Sanchez	N/A	Gold
Cycling	Ind. Road Race HC-C	Oz Sanchez	N/A	Bronze
Cycling	500m Time Trial LC1-2/CP4	Jennifer Schuble	N/A	Gold
Cycling	Ind. Time Trial LC1-2/CP4	Jennifer Schuble	N/A	Silver
Cycling	Ind. Pursuit LC1-2/CP4	Jennifer Schuble	N/A	Silver
Goalball	Women's Team		Kenneth Armbruster	Gold
Judo	100 Kg +	Greg Dewall	Raul Tamayo	Bronze
Rowing	Mixed Coxed Four		Karen Lewis	Silver
Rowing	Single Sculls-A Women	Laura Schwanger	Karen Lewis	Bronze
Rugby	Men's Team		James Gumbert	Gold
Sailing	1 Person Keelboat	Jon Ruf	Marko Dahlberg	Bronze
Sailing	2 Person Keelboat	Tucker and Scandone	Mike Pickney	Gold
Sitting Volleyball	Women's Team		Mike Hulett	Silver
Swimming	100 m Butterfly S8	Jessica Long	Andrew Barranco	Gold

Sport	Event Final	Athlete Name	Personal Coach	Finish
Swimming	100m Breaststroke S8	Jessica Long	Andrew Barranco	Bronze
Swimming	100m Freestyle S8	Jessica Long	Andrew Barranco	Gold
Swimming	400m Freestyle S8	Jessica Long	Andrew Barranco	Gold
Swimming	200m Ind. Medley SM8	Jessica Long	Andrew Barranco	Gold
Swimming	100m Breaststroke SB7	Jessica Long	Andrew Barranco	Bronze
Swimming	200M IM SM6	Miranda Uhl	Chris Oliver	Gold
Swimming	50m Freestyle S7	Cortney Jordan	Colin Sully	Gold
Swimming	100m Freestyle S7	Cortney Jordan	Colin Sully	Silver
Swimming	400m Freestyle S7	Cortney Jordan	Colin Sully	Silver
Swimming	200m Ind. Medley SM7	Cortney Jordan	Colin Sully	Bronze
Swimming	100m Freestyle S5	Roy Perkins	Don Watkinds	Bronze
Swimming	50m Butterfly S5	Roy Perkins	Don Watkinds	Gold
Swimming	100m Freestyle S10	Ashley Owens	Doug Gjertsen	Gold
Swimming	400m Freestyle S10	Ashley Owens	Doug Gjertsen	Silver
Swimming	200m IM SM7	Rudy Garcia-Tolson	Jimi Flowers	Gold
Swimming	100m Butterfly S8	Amanda Everlove	Jimi Flowers	Silver
Swimming	100m Breaststroke S7	Rudy Garcia-Tolson	Jimi Flowers	Bronze
Swimming	200m Ind. Medley SM9	Cody Bureau	Jimi Flowers	Bronze
Swimming	200m Ind. Medley SM8	Amanda Everlove	Jimi Flowers	Silver
Swimming	50m Freestyle S8	Amanda Everlove	Jimi Flowers	Silver
Swimming	100m Backstroke S7	Lantz Lamback	Jimi Flowers	Gold
Swimming	100m Freestyle S7	Lantz Lamback	Jimi Flowers	Silver
Swimming	400m Freestyle S7	Lantz Lamback	Jimi Flowers	Silver
Swimming	50m Freestyle S7	Lantz Lamback	Jimi Flowers	Bronze
Swimming	100m Backstroke S9	Jarrett Perry	Jimi Flowers	Bronze
Swimming	400m Freestyle S10	Susan Beth Scott	Jimi Flowers	Bronze
Swimming	200m IM SM7	Erin Popovich	John Mattos	Gold
Swimming	100m Breaststroke S8	Erin Popovich	John Mattos	Gold
Swimming	100m Freestyle S7	Erin Popovich	John Mattos	Gold
Swimming	400m Freestyle S7	Erin Popovich	John Mattos	Gold
Swimming	50m Butterfly S7	Erin Popovich	John Mattos	Silver
Swimming	50m Freestyle S7	Erin Popovich	John Mattos	Silver
Swimming	100m Backstroke S9	Elizabeth Stone	Nathan Manley	Silver
Swimming	100m Freestyle S4	Cheryl Angelelli	Shawn Kornoelje	Silver
Swimming	50m Freestyle S4	Cheryl Angelelli	Shawn Kornoelje	Silver
Swimming	100m Freestyle S4	Aimee Bruder	Sherry Colgin	Bronze
Swimming	50m Freestyle S13	Kelley Becherer	Steve Keller	Silver
Swimming	100m Breaststroke SB6	Deborah Gruen	Tim Wise	Bronze
Swimming	100m Freestyle S10	Anna Eames	Tom Franke	Bronze
Swimming	100m Butterfly S10	Anna Eames	Tom Franke	Gold
Swimming	100m Backstroke	Justin Zook	Tom Franke	Gold
Tennis	Men's Double	Taylor and Wagner	Dan James	Gold
Tennis	Quad Singles	David Wagner	Dan James	Bronze

Some Principles of Practice

Richard A. Schmidt
Human Performance Research

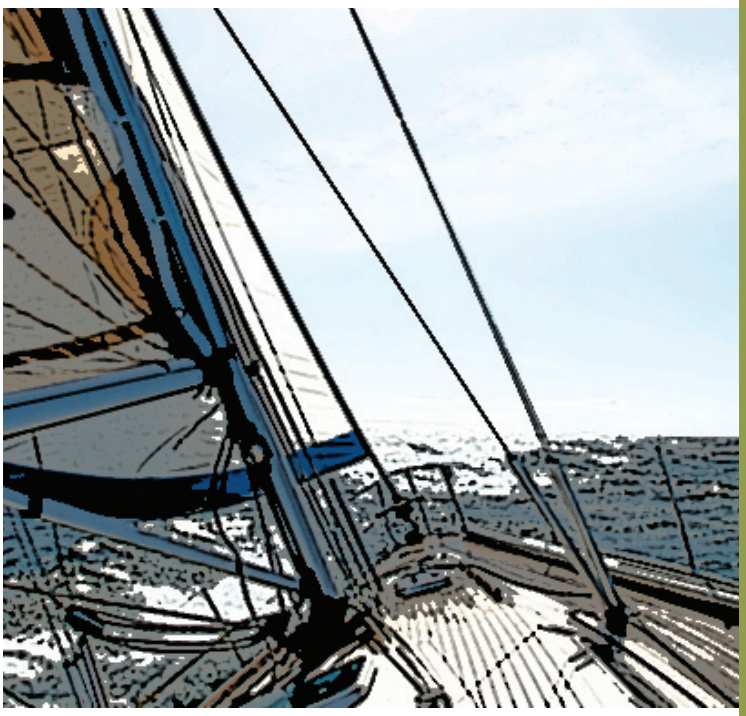
Experimental psychologists, kinesiologists, and other scientists have been working for many decades trying to understand how it is that some people can perform at incredibly high levels of skill, and how to practice so as to maximize performance. This is of great interest in countless practical applications. In this brief article, I outline some of the fundamental principles that form our understanding of how and when to practice.

First of all, it should come as no surprise that the most important thing one can do to improve performance is to practice. Psychologists call this "deliberate practice." There is no doubt that the best performers in sport have spent incredible amounts of time at their craft. Be aware that the gains from practicing when one is already at a high level are small and difficult to achieve. I'm reminded of a study of industrial cigar makers who were still improving in time/cigar even after 10 years or 7,000,000 cigars! The key principle here is to practice--and practice lots.

OK, we all know that. But now the question is how to practice, what do to, when (how often) to do it, how to use teachers/coaches, and how to evaluate the products of your efforts. I think these questions are often best answered by understanding a few, key points about performance and learning, discussed next. I'd rather not give a list of do's and don'ts for practice. Instead, if you understand some of these principles, you can design effective practice for yourself.

The champions do it this way. In discussing learning and sport, I often hear people say that so-and-so champion does it this way, so that must be optimal. After all, how did they become a champion if he/she did not practice nearly optimally? This kind of approach simply ignores 100+ years of research and scientific study of these issues. In many ways, this approach to practice is probably adequate. But in many other ways, common-sense views about how and when to practice are contradicted by careful research. Several of these findings can make a large difference in the effectiveness of practice.

Learning-performance distinction. Perhaps the most important principle is the distinction between learning and performance. Learning can only be measured by changes in performance. During practice, two kinds of results happen. Practice itself can produce effects in us that are relatively permanent; this is what we want, and we call it "learning." But practice also produces temporary effects on performance. Sometimes these are positive, so performance is facilitated during practice (e.g., feedback from coaches, repetition of a skill); sometimes these are negative (e.g., fatigue, distraction), so performance is depressed during practice. The mistake we often make is to consider skill gains in practice as necessarily due to (relatively permanent) learning, when they might only be the result of temporary factors. However, when skill is evaluated on a subsequent day, or in an important contest, the temporary effects of practice will have dissipated, leaving one with a different level of performance than experienced during practice. If the practice method facilitates performance temporarily (e.g., feedback from a coach), then performance will drop when measured later. I'll have more to say about this later.



Goals of practice. Perhaps it is obvious, but we do deliberate practice so that the effects can be evidenced on some "test," such as the next competition or the Olympic trials. Strictly, we don't care very much about our performance during practice, so long as our performance on the "test" is maximized. The problem is that many methods of practice facilitate performance temporarily (giving a false sense of accomplishment), and then these gains dissipate by the time of the "test" is performed, producing disappointing performance when it is needed most.

The best example of this is repetitive practice at a driving range in golf (or repeating hundreds of free-throws in basketball, or hundreds of jibes in a row in sailing). Repetition produces temporary gains in performance, and gives a strong sense of accomplishment. When asked, learners have strong confidence in what they think they have learned. But, when the later "test" comes (e.g., a round of golf, a basketball game, or a sailboat race), these gains often disappear, showing that their confidence was ill-founded. For scientists in this area, the driving range in golf represents the "classic" misconception about how to practice.

How learning is evaluated. I hope it is clear from the above that the amount one has learned should not be evaluated during the practice session. Many factors either enhance or depress performance during practice, giving a false picture of how much learning has occurred. As a result, learning is measured on some subsequent "test" of retention, after the temporary effects have dissipated. This "test" is whatever it is that one wants to optimize by practicing (e.g., next weekend's competition).

This is the way we do it in the laboratory, too. We might study different methods of practicing. These produce a mixture of relatively permanent and temporary effects during practice. Then, we give a "test" several days later. The method that produces the best performance on the "test" is the one that has produced the most learning. Again, we do NOT measure learning based on the performance during the practice phase--just as the swimmer would not measure gains in fitness during a swimming workout, but rather would wait for recovery from fatigue.

When these methods are used in the research, we find that some methods produce strong gains in performance during practice, but do not last until the test. In fact, we find sometimes that, of two methods, the one that produces the better performance during practice produces the poorer performance on the test. This is critical, because our whole goal in doing deliberate practice is to enhance the test performance. Below are some examples of this principle.

Specificity of learning principle. One of the things we know is that the products of learning are very specific to the particular skill and context in which we perform. In one form, we all know this. If we want to race in 20-knot breezes, in chop, in a Laser, then we would practice in 20-knot breezes, in chop, in a Laser. What we forget sometimes, is that the practice methods we use often deviate significantly from the context that is the ultimate goal of practice, and this is an important consideration.

Consider repetition of golf shots at the driving range, or of free-throws in basketball. In golf, we never hit the same shot twice in a row (unless we cheat). In sailing, we seldom do many tacks or jibes in a row, rather these are separated in time by other things. Practicing many tacks in a row, or hours of downwind sailing at a stretch, both deviate from what we do in a typical race. The message is to consider what the context is that you want to maximize, and then design practice so as to mimic that to the greatest extent possible.

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This is also related to drills. Coaches often generate special drills to exercise some particular skill. We need to ask whether that drill is sufficiently similar to the skill that we really want to learn that transfer to that skill will occur. Some drills are great, but some have too many differences from the real thing that they are probably not effective.

Practice scheduling. How do I decide when to practice? Consider two methods of practicing three skills (e.g., jibe, tack, straight-line speed). A common-sense method for practicing is to mass practice: do 100 jibes, then 100 tacks, and then 30 minutes of speed practice. This is called "blocked practice." An alternative would be to do one jibe, one tack, one minute of speed practice, then one tack, then one jibe, etc., never repeating the same skill twice in a row. This is called "random practice."

Much research since the late-1970s has shown that, during practice, blocked performance is far superior to random performance, which is not surprising. But what was surprising was the discovery that, for performance on a test given on the next day (e.g., next competition), random practice was better than blocked. That is, a condition that made performance worse in practice (random practice) increased learning as measured on a retention

test. Sometimes this effect is small, but sometimes it is huge--and always in favor of random practice. This is counter to common sense. It occurs with cognitive and motor tasks, young and old subjects, skilled and unskilled learners, etc. What's going on here?

One thing going on is that blocked practice does not mimic the real context that the learner will use on his own "test." For example, blocked practice at the driving range does not mimic the game of golf very well. Doing hours of downwind practice does not mimic buoy racing very well. One thing missing in blocked practice is the transition from one skill to the next and back again that is present in the actual test of interest.

Another thing missing in blocked practice is that the performance on one attempt provides very much assistance in performing the next attempt. Small adjustments are made from trial to trial. One thing this does is to provide "the solution" of the problem for the learner on the next attempt rather than forcing the learner to generate it him/herself. Consider this example. You are in 5th grade, and you want to learn to do long division "in your head." In deliberate blocked practice I ask you, "What's 36 divided by 12?" You struggle, finally coming to the answer "3." On the next trial, I ask you, "What's 36 divided by 12?" Your performance is facilitated now because you remember the answer you just gave, so you don't have to generate the answer again. If I gave you 10 of these in a row, your performance would be perfect (or nearly so), but you would not be exercising the generation of the solution, only the repetition of the remembered answer. This is an example where a factor that facilitates performance in practice (blocked repetitions of a particular division problem) is detrimental (as compared to a randomized presentation of several problems) to learning and measured on tomorrow's test.

The only exception to this principle is related to absolute beginners at a skill. The learner has to be able to get through the skill at some, minimal level before random practice can be beneficial. So teachers often use blocked practice only at first, until the person can just do the task, and then practice is switched to random. This level of skill is very low at this point, however, and it is clear that most subsequent practice is more effective under randomized conditions.

As applied to sailing, one could assess what goal performance he/she wanted to optimize. Say it's getting around the buoys in a dinghy race, including tacking, jibing, straight-line speed, etc. A typical method would be to set up a small course and sail it. Inherent in this is a mixture of skills from moment to moment, minimal repetition of a given skill, and duplication of the conditions in the actual race.

Feedback. We have known for many decades that feedback about errors, combined with instruction as to how to eliminate the errors, is a critical variable for learning. This information is called "feedback." Coaches can give valuable information that facilitates performance during practice. In fact, without this information, mere practice under some conditions can be useless.
But let's go back to the principles. In the test, the coach is not present to give feedback. If the learner listens to the feedback,

responds to it, listens again, responds to it, etc., the learner will be improving performance at a furious rate. But is the learner really using the processes that would be used when the feedback was not present? Probably not. So, we must generate a way to allow the learner to use the guidance from the coach without coming to rely on this feedback.

Some experiments have shown recently that giving feedback after every attempt (100%) is far better for performance during practice than giving it after every other attempt (50%). But on tests of retention given the next day without any feedback, the subjects with only 50% feedback performed better than those who had practiced with 100% feedback. One interpretation was that feedback after every trial was used as a kind of "crutch," so that the learner was unable to perform effectively when the "crutch" was removed in the test. Other than reducing the amount of feedback given, here are a couple of other things a coach could do with feedback, all supported by the research.

First, ask the learner to generate his/her own feedback. "What went wrong with your tack that time"? This forces the learner to evaluate their own internal feedback (how it looked, felt, sounded), and prevents the learner from relying too heavily on the coach's feedback. One time we gave starting practice for the bow person to evaluate how far the boat was from the line at the gun. We'd do one exercise, ask the learner for the estimate, then tell the learner what it was, then repeat the process, or even switch to another type of task.

Second, take videos of performance from for 20 minutes, then play it back to the learner with the coach's commentary. Note that this prevents feedback after each attempt. Also, the coach could direct the learner to the aspect of the skill that needs work. "Look where your feet were that time." Simply viewing videos without a coach's instruction has been shown not to be very effective for learning.

Third, a coach could watch the team for a while, making mental notes about what is going on. We all know that just about any kind of error can happen once, and the coach's goal would be to evaluate what the performer's general pattern of skill is. Then, after watching a while, the coach could stop and say, "OK, what I see is this. Try it like that." This prevents the learner from being dependent on the feedback, and prevents the correction of every little error that might not ever happen again.

Fourth, I have seen guest experts come and basically run things. Performance generally becomes very good. But, the question is really related to how well that athlete or team will do next time, when the expert is not there. It is easy for a coach to do/say too much so that the learners do not acquire the capability to perform on their own.

SUMMARY

There are many more principles for practice, but space is short here. But many of these are understandable from just these few principles about learning. A key point is to practice. Beyond that, a key point is not to be fooled by your performance during practice. Many practice methods that seem, on the surface, to be beneficial are effective for performance at the moment, but are not effective for the highly critical test later on. I have given several examples here. And, it is remarkable how many of these principles are not what we would have guessed, and are certainly not based on what some particular champion did in his/her practice.

Many practice methods that seem, on the surface, to be beneficial are effective for performance at the moment, but are not effective for the highly critical test later on.

I suspect you won't be convinced by what you have read here, so I invite you to check the sources for yourselves. These principles are summarized and explained in our textbooks. The Schmidt and Wrisberg (2004) book is intended for beginners in teaching, whereas the Schmidt and Lee (1999) is more research-oriented. I have also included a copy of a paper by Schmidt and Bjork (1992) which gives some of the evidence for this way of thinking.

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LEARNING PREFERENCES

By Juli Dunn
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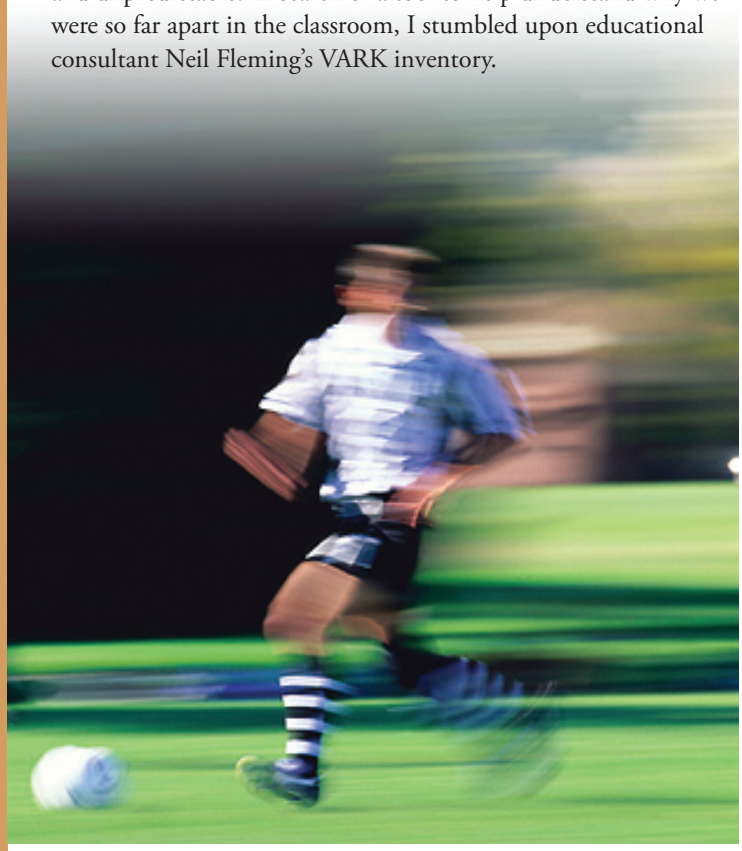
In 2004, I met my research cohorts in Christchurch, New Zealand, for the first time in person. We had been collaborating via e-mail on learning-preference research since the late 1990s. It is a collaboration of strange bedfellows in a sense: an American professor, a Kiwi rugby coach and a Kiwi educational consultant brought together by a shared passion for lessening the gap between how educators teach and how students learn.

"AHA" MOMENTS AND HALLWAY CONVERSATIONS

My involvement in this group happened by accident. As the professor of an introductory sports medicine course, I found myself constantly perplexed by one student's inability to grasp elementary concepts. Because this student also was a varsity soccer athlete, I enjoyed interactions with her outside of the classroom in the other realm of my job as the college's certified athletic trainer. Our exchanges always seemed fluid and easy, but in the classroom, her interactions, abilities and skills seemed disjointed and unpredictable. In search of a tool to help understand why we were so far apart in the classroom, I stumbled upon educational consultant Neil Fleming's VARK inventory.



In the fleeting moments before a 9 a.m. class, the inventory's ease, use and self-scoring nature appealed to me. I administered it in the first five minutes of class. The results shaped the "aha" moment that has precipitated my research interests for the past decade. Because of my strong visual preferences, my teaching methods catered to a similarly preferenced learner. The young woman who started me down this road of inquiry seemed now a polar opposite.

With a strong read/write preference, it was as if we were speaking different languages — mine the language of colors, shapes, symbols, charts and 2-D images; hers the language of text, black marks on a white page.

In a passing hallway conversation with her coach, I shared my newfound knowledge that was reshaping my pedagogy on the fly. When I explained her learning- preference results, his response fueled my interest in exploring the differences in coaching methods and student-athlete learning preferences: "Makes total sense," he said. "She never gets a word of what I say to her."

In the 10 years since the "aha" moment and the hallway conversation that followed, my revised inventory has been used internationally by coaches and athletes in more than 20 sports at varying performance levels (high school to Olympic-caliber athletes).

The data I have collected supports the idea that what happens in the classroom (or in some cases doesn't happen in the classroom) between teacher and student is not all that different from what happens (or doesn't happen) between coach and athlete on the field, court, slopes or in the pool. The main difference is the role that time plays in physical-performance tasks versus knowledge-acquisition tasks.

While students in the classroom have time to process information presented in a modality outside their primary preference(s), student-athletes must often make snap adjustments in the stress of a performance setting constrained by time. Any delay in response between coach and student-athlete could equal a missed opportunity or ill-timed motor response. The time-sensitive nature of sport necessitates that coaches and athletes speak a common language of instructions, verbal cues and appropriate motor responses.

RESHAPING THE COACH/ATHLETE DYNAMIC

Results from the VARK inventory for athletes have power-punching potential. The power of knowledge of one's learning

preferences and the preferences of other athletes and coaches can enhance coaches' and athletes' motivation and skill acquisition. Coaches who are able to use a variety of methodologies to reach a range of preferences within an athletic group have the potential to enhance athletes' performances. They recognize that by matching coaching methods to athletes' learning preferences they lessen the potential for miscommunication.

Richard Smith, coaching manager of the New Zealand Academy for Sport, began using the VARK inventory for athletes with Olympic-caliber competitors prior to the 2004 Olympic Games. Our paths converged when my data from the States supported his data from New Zealand and Australia. Similar to the classroom data, we discovered that coaches seem to be at odds with the athletes they coach. The most noticeable difference occurs in two bi-modal variables: read/write-kinesthetic and auditory-kinesthetic.

Coaches are far more likely to have read/write preferences than the athletes they coach. Similarly, athletes are more likely to have auditory modalities. In data collected thus far (n=1800), coaches with read/write preferences outnumber athletes 2-to-1. The converse also is true: Athletes outnumber coaches 2-to-1 in auditory modalities. By developing strategies that coaches can employ with the athletes who have particular VARK profiles, we are revolutionizing coaching strategies in a range of settings: pre-performance, performance and post-performance.

Coaches internationally (New Zealand, Australia and Canada) and nationally (U.S. Men's Volleyball, NCAA Division I/II/III colleges and high schools) are using their own VARK inventory results in concert with the results of their athletes to transform the impact that their coaching methods have on their athletes.

FOR BETTER OR WORSE?

For high school football coaches in North Dakota, VARK inventory data explained why college and high school athletes leave playbooks in locker rooms across the nation. With less than 1 percent of the athletic population demonstrating a visual preference, the tried-and-true playbooks are becoming obsolete. The binders filled with "X"s and "O"s that have been a staple of athletic culture are giving way to small-group coaching in which members of a coaching staff are paired with groups of athletes with similar learning preferences. The result? Student athletes with strong visual preferences still receive playbooks, but students with strong kinesthetic or auditory preferences are not subjected to what they see as time-wasting methods.

Coaches prime student-athletes with a strong auditory preference prior to practice with a short lecture about the day's practice objectives. These student-athletes' cohorts with kinesthetic and read/write preferences are exposed to walk-throughs, video analyses, tactical write-ups and written coaching theory, respectively.

When these small groups of athletes and coaches reconvene as a full team, individual coaches have equipped groups of student-athletes with timely and appropriately presented information that puts all the student-athletes on the same page despite a wide variety of learning preferences. This coaching plan and ensuing methodology sets the stage for productive, efficient and difference-valuing practices and competitions.

When the New Zealand Academy of Sport administered the VARK inventory to their elite coaches, they anticipated it would serve as a coaching advantage, but they might have underestimated the extent to which the coaches used the knowledge they acquired.

A national-level coach, who also coached professionally, had knowledge about how her national-team athletes preferred to receive input. When she found herself coaching professionally against one of her national athletes, the information became the key to victory. As a strong visual learner, the athlete required spatial input to position her on the field of play and thus was in constant contact with opposing players. Armed with this knowledge, the coach instructed her players to keep a considerable, and perhaps unorthodox, distance from this marquee player.

The result: The visually dependent athlete grappled around the field of play, appearing for the first time in her professional career to be unaware of the objective of the game.

While learning-preference knowledge is not the silver bullet to enhanced coaching methods and athletic performance, it can begin to lessen the gap between how coaches present information and how athletes receive it. Such knowledge is perhaps most important in the high school and developmental arena where many athletes stop playing because the gap between instruction, learning and performance becomes too great, and the differences between coaches' learning preferences and student-athletes' learning preferences are at the greatest odds.

As athletes rise in the ranks of elite performance, the differences between athlete learning preferences and the learning preferences of the coaches diminish, leading us to wonder: Do certain learning preferences advantage athletes and coaches in the elite ranks? Are certain athletes disadvantaged because of their learning preference and not necessarily their athletic performance? Can diverse coaching methods aid in developing a group of diverse learners that persist into the elite athletic ranks?

We hope future research can help to answer these questions.

Juli Dunn is associate professor of sport studies and head athletic trainer at Whitman College, where she has worked since 1993. To see the athlete VARK inventory, visit www.vark-learn.com/english/page.asp?p=athletes

GPS Applications in Sport

By Scott Riewald
USOC Performance Services- Endurance Sportfolio

Global Positioning Systems (GPS) are becoming increasingly integrated into today's society. You can get a stand alone GPS unit for your car that will provide turn-by-turn directions to help you get you from your home to the nearest coffee shop. Other GPS units are incorporated into watches, cell phones, personal computers or PDAs to provide instantaneous information on your location anywhere in the world. This information can prove to be a lifesaver for a lost hiker, but can also yield data that has the potential to enhance athletic performance. As with many technological advances, GPS has made in-roads into the sporting world; more and more we are seeing athletes and coaches use this technology to enhance training and provide valuable feedback to athletes. This article serves to highlight some of the present and potential applications of GPS and hopefully will get you thinking about how GPS can be used in your sport.

THE INNER WORKINGS OF GPS

The heart of a GPS device is a small receiver chip that "links" to an array of satellites orbiting above the earth. By integrating the information from multiple satellites, the chip is able to compute your real-time position virtually anywhere on the face of the earth and then provide this information back to the user. As position changes over time, it is possible to for the GPS unit to compute near real-time velocity data as well – information that can be valuable to athletes from a wide range of sports. A number of different companies produce GPS devices, but one in particular, Garmin, makes a range of GPS watches that have proven to be useful for a wide range of sports. Their GPS technology has also been integrated with a number of different analysis programs to produce some pretty cool performance monitoring tools – some of which are described below.

BRINGING THE TECHNOLOGY TO SPORT

Having position and velocity data can be critical to evaluating training and/or competitive performance. One example of a sport that uses this type of information as a part of their daily training is rowing. Matt Imes, the High Performance Director for rowing, says that "The core of our on water training is controlled by 500m split times and we use the time, distance, and velocity data to monitor our training and the time spent in different training zones. Since 2006, most US boats have used GPS units for obtaining close to real time speed data during training. One of the greatest attributes is that GPS is a 'drop-and-go' type of system, meaning we don't need any special equipment mounted to the boat and we can easily transfer the GPS units from one boat to another." The day-in-day-out use of GPS provides rowing, and a number of other sports, with valuable information the coaches and athletes can use to shape their training.

With that said, the true power of GPS in sports comes when that information is integrated with other applications – many of which can be accessed free of charge, or for a minimal fee, on the internet. Let's look at a couple of these products along with information on how to access them:

- MotionBased (www.MotionBased.com): This website allows you to upload data from your Garmin GPS watch and do all sorts of things with it, from linking your GPS data to any number of maps (topographical, street, elevation contours, satellite imagery, and so on) allowing you to retrace your route, to computing elevation changes experienced over the course of the training (by linking the position data to an "elevation database"). Additionally, if multiple athletes train on the same course, it is also possible to have these athletes "race" one another in the computer environment, providing information on strengths/

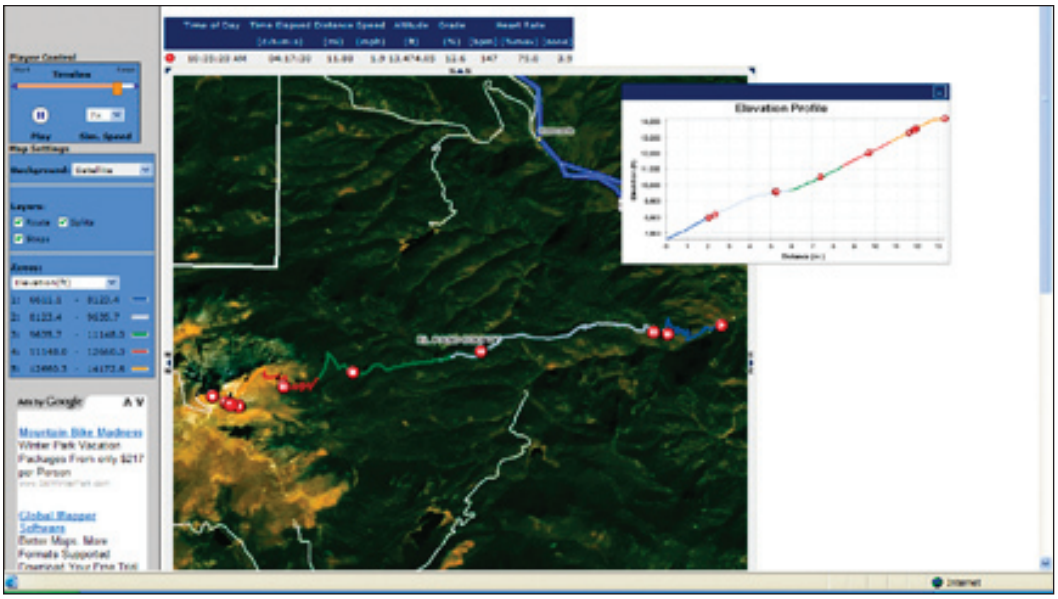


Figure 1: GPS data collected from a race up Pikes Peak. Shown graphically using the MotionBased software.

weaknesses and helping to develop race tactics. Figure 1 shows an image of one individual's race up Pikes Peak. The picture utilizes MotionBased to overlay the GPS data on top of satellite imagery of the region. From this view it is possible to get splits/paces between user defined points, track elevation changes and view the details of the course.

- Google Earth (www.earth.google.com): Google has created a number of creative and cutting edge technologies, but arguably one of the coolest is Google Earth – which provides satellite imagery of any location on earth. It is possible to upload GPS data to Google Earth to get an even more detailed visual representation of a training route or competition course. It is possible, once the GPS data is uploaded, to perform a "fly by" in which you get an aerial or even an athlete's perspective of the route – including the turns, topography and landmarks. While Google Earth does not provide quantified data on such things as elevation changes, the detail and ability to change perspective are remarkable features that can provide vast amounts of data to an athlete. Figure 2 shows the same data from the race up Pikes Peak, but from an entirely different perspective. It would be possible to "zoom in" on the course and see even greater course detail. The larger scale was chosen to appreciate the ability to track elevation changes.
- Link the GPS to other data collection devices, like a heart rate monitor. In some instances the GPS watch can double as a heart rate monitor, in which case the data is all stored together in the watch.

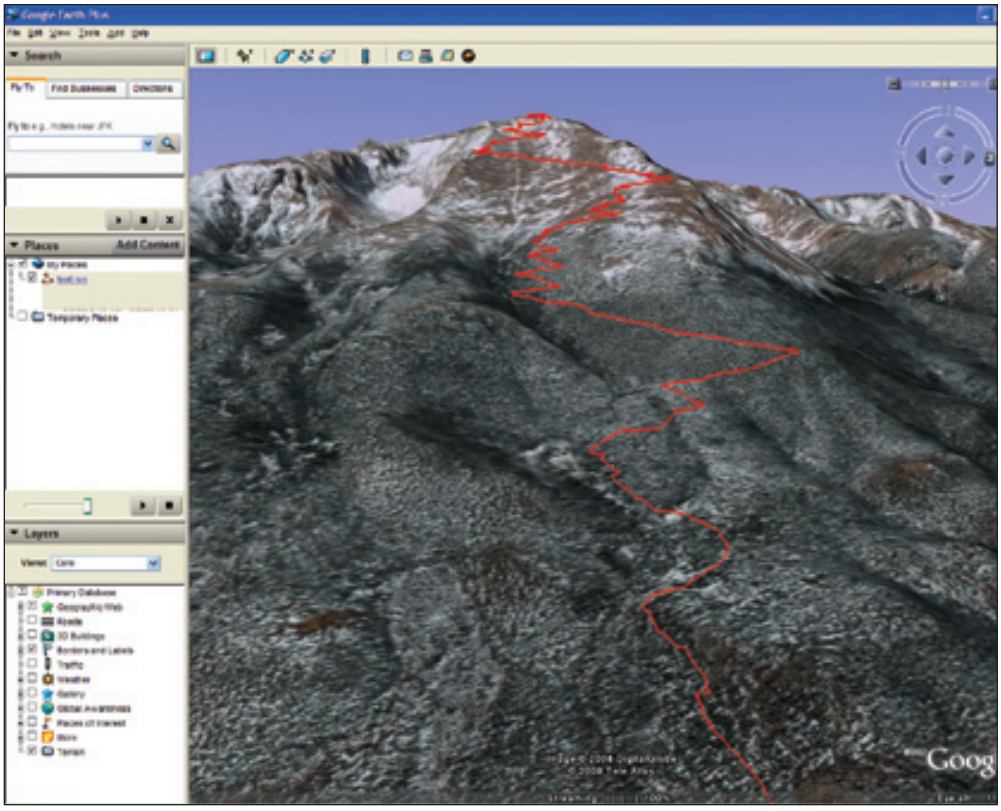


Figure 2: GPS data viewed in Google Earth. Data is the same as those represented in figure 1.

REAL-WORLD APPLICATIONS IN SPORT

With this introduction serving as a background, let's look at some of the ways GPS is used in a variety of sports. The idea is that these examples could give you ideas on how this technology could be brought into your training or competition, but recognize, more and more applications are being developed almost every day.

Monitoring distances and speeds in real time: Sometimes this is all the information an athlete needs. Maybe a tennis player wants to know how far she has run during the course of a match to be able to assess how well her training compares to the demands of competition. Maybe another athlete wants to monitor training velocity during a long distance run. Take a sport like kayak, for example. Like rowing, much of the training revolves around completing set distances at specific speeds. The GPS unit can provide all of this information to the athletes essentially in real time, and it is common practice for each athlete to have a GPS unit mounted in the boat during every training session. Most GPS devices will also have a feature that allows you to save and track data. Many times the tracking functionality requires uploading the data to a computer program. For example, triathletes can ride or run the same course at set times during the year. With GPS they are able to compare performances with a greater level of detail than they could by simply comparing final times.

Tracking athletes in team field sports. In field sports, like soccer, there is often a desire to track players over the course of the game and provide in-game and post-game analysis. Many professional soccer teams in Europe, for example, use such systems to provide positional information for each player during the game as well as generate summary data at the end of the game overviewing such variables as the distance run by each player during the game, the number of sprints and the time spent sprinting, and the recovery time between exertions. Link this with physiological data, like heart rate, and you start to get a better feel for the physical and physiological workload experienced by each athlete and how they respond in a game or practice.

Scouting and simulating a race course: It is possible to "reproduce" a competition course and provide enhanced training opportunities to athletes. As an example, a watch-based GPS unit was recently taken to Beijing to gather information on the cycling course to be used in the 2008 Paralympic Games. The cycling coaches drove the course with the GPS unit collecting data the entire way. Upon returning to the United States, the GPS data was linked with data from MotionBased (see Figure 3) and Google Earth to provide a visual representation of the course the athletes would be riding – giving the athletes the ability to visualize the course and develop their race tactics even before they stepped foot in China. From the MotionBased website, the data was also converted into a format that could be imported and read by a Computrainer – a computer-based cycling training device. Based on the data uploaded from the GPS device, the Computrainer would adjust resistance and other variables to simulate the course terrain; athletes could essentially "ride the Olympic course" while still in the United States. They could also use this information to develop their race tactics as well as adjust training programs to prepare them for the physical and physiological demands of the course.

Integrating GPS with other applications: Many GPS watches have an option for recording heart rate data. Other sport-specific applications are also being developed to integrate GPS with other information. For example, the American company Saris will soon be marketing a wireless Powertap unit (that measures on the road cycling power) that is compatible with the Garmin 705 GPS units. This will allow cyclists to simultaneously track power, position, speed, and elevation in real time, as well as allowing for computer download for more detailed analysis.

Indoor training applications: The nature of GPS is such that the receiver must be able

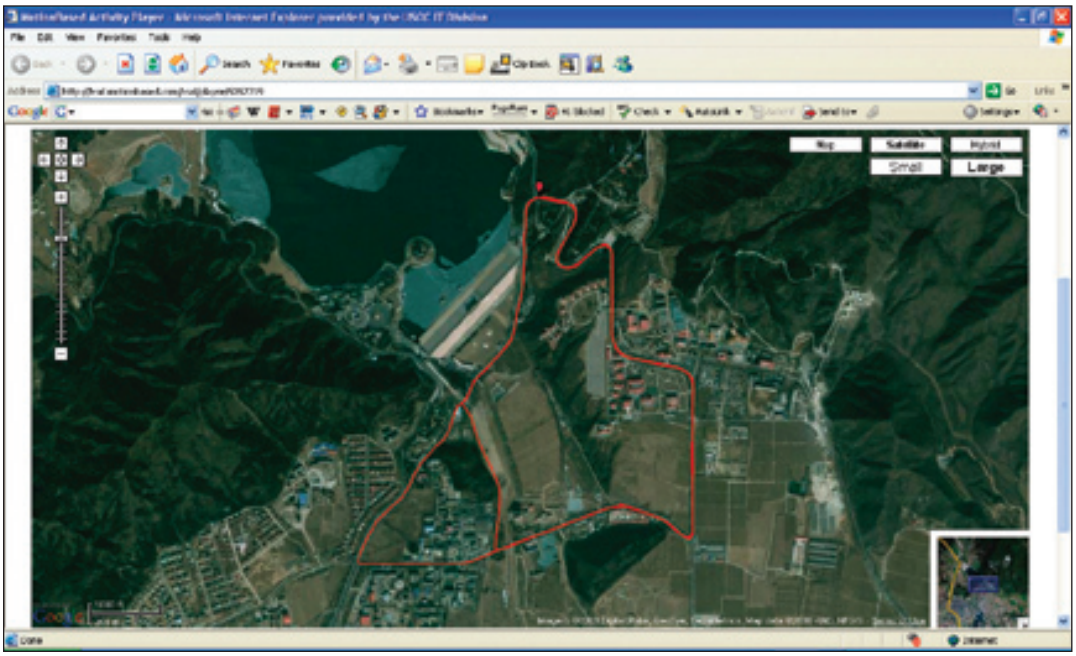


Figure 3: The Beijing Paralympic cycling course. Coaches drove the course and were able to provide visual and training specific information about the course to help the athletes prepare appropriately for the demands of the course.

to communicate with the satellites orbiting above the earth – meaning that it has limited or no benefit to sports competing indoors. However, several companies, like InMotio (www.inmotio.eu), have developed indoor units that are being used with sports like speed skating. While this is not a "true GPS" application the principles are similar; athletes wear sensors that are tracked by permanently fixed monitoring stations placed around the skating oval. The data that is provided is very similar to what one would get from a GPS unit in an outdoor setting – athletes can track position, to get a sense for the track they take around the oval, and velocity, seeing if there are any areas where they are scrubbing speed and could improve performance. Much of this data is not accessible from standard video recording.

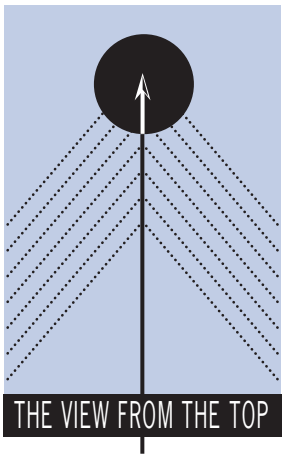
LIMITATIONS

As with any technology, there are limitations or tradeoffs you must consider when deciding if there is an application for your sport. First and foremost, it is important to know that accuracy is limited – typical errors can be as large as a meter of more, depending on the GPS device used. These positional errors will also carry over into any subsequent velocity calculations. While someone is a car using GPS to get around town, or even a distance runner racing a 5k, may not care if her position is off by this much or the average speed was off by 0.01 miles per hour, other athletes will require a greater level of precision. Additionally, in sports where athletes train or compete at high speeds, or where speed changes rapidly, the GPS data may lag behind the actual performance somewhat. At race pace in rowing, for example, the GPS output typically lags behind the actual performance by as much as 7-10 seconds. The GPS system provides great data over longer distances and/or once the athletes have reached a steady-state velocity, but it does not provide feedback rapidly enough to be able to analyze performance on a stroke by stroke basis – a feature that would be especially important when analyzing the first 5-10 strokes at the start of a race.

Cost and practicality are also issues to consider. A GPS watch with basic position and velocity feedback can be purchased for several hundred dollars. However, devices with greater functionality and/or are integrated with other devices can cost considerably more – in excess of $1000. Moving to indoor applications, with permanently mounted tracking stations, increases the costs even more. One unit researched for potential use at an indoor speedskating oval was priced at over $200,000. Yet, depending on the quality of data delivered by the system, it could be worth the cost. It is a matter of weighing the costs vs. the benefit of the data you receive.

FINAL REMARKS

Recognize that even though there are limitations, GPS technology is continually evolving and "tomorrow's devices" will function with an accuracy and level of performance beyond present capabilities. As technology improves and manufacturers recognize the specifications needed in a robust, sport based GPS unit, it is likely that many of the limitations we see today will be addressed. Clearly, there are a number of different ways GPS can be used to enhance sport performance, even with the present technology, and this article has only scratched the surface. Is there an application for GPS in your sport? Think about it and how you could use GPS to "push the envelope" and enhance the performance of the athletes you work with.



View from the Top
Guy Baker

1. What got you interested in being a coach?

I was first drawn to coaching while I was in high school. My high school coach had a tremendous influence on me. We had a close relationship and we had numerous conversations about his experiences as a coach. He had coached many different sports, volleyball, rugby, swimming and was a new to water polo as was I. In addition, he had coached in many different parts of our county and had a vast knowledge of how a team should work. He was able to take what he had he learned from other sports and apply them to our team. He always emphasized being fit and mastering the fundamentals, which is the foundation of the USA Women's Water Polo program.

2. The team finished 4th at the 2006 FINA World Cup. How did you get the team to re-focus and finish 2007 with a 35-0-1?

First, it was not difficult to get the team re-focused after finishing fourth at the 2006 World Cup. Not reaching a goal can be a very motivating factor for players and coaches. Our goal is to medal at each major FINA event, Olympic Games, World Championships, World Cups and World League Super Finals. Starting with the Sydney Olympic Games we had been fortunate to medal at seven of the nine events prior to the 2006 World Cup. In addition, we had won the 2006 World League Super Final in the lead up to the World Cup. We were very disappointed in a fourth place finish and I would say that experience was very beneficial in our 2007

Head Coach — Women's Water Polo- 2008 Silver Medalist

preparation. I also think our 2006 experience is a positive in our preparation for the Olympic Games.

The undefeated year was a surprise and was something we were unaware until after the fact. We don't follow our won-loss record; the focus is always the major event of the year. Our goals for 2007 were to medal at the World Championships and to win the Pan American Games in order to qualify for the Olympic Games. We were able to win both tournaments in addition to World League Super Final. It is always fun to remember 2007; however, right now we are so focused on our preparation for the Olympic Games that last year seems like years ago.

Second, it was easy to determine that we needed to improve our half court defense, 5x6 (power play) defense and fitness levels. When we returned to training in September 2006, we started on the first day emphasizing those three areas. 2007 showed that we are still able to move forward after an unsatisfactory result.

Third, the 2006 World Cup was a great reminder for our program. There is a very small difference between success and failure at the international level. Most games are decided by one goal and there is little room separating the top teams. For example; at the 2006 World cup we lost the semifinal game in a penalty shoot out and the bronze medal game by a goal to a team we had beaten by one goal in the preliminary round. The 2007 World Championships were a different story for us; in the semifinals we won in overtime and won the gold medal by a single goal. Again, the difference between winning and losing are very small. (In Beijing, Netherlands won by 1 point-- 9-8)

3. What is the biggest difference in water polo today versus ten years ago?

Everything has improved over the last ten years. All the teams are better physically, technically, tactically and psychologically. Since women's water polo was added to the Olympic Games in 2000, teams are training and competing more. Each year the level of play has increased.

4. You have been instrumental in developing an athlete pipeline for water polo. You actually oversee the National team and three other national teams (U-20,U-18 and U-16). How do you manage to get this all done?

I think an athlete pipeline that is vertical and seamlessly integrated is absolutely critical for long term success. I wanted USA Water Polo to hire me following the 2000 Olympic Games as a full-time coach, with the top priority being to build an athlete pipeline starting with our youngest National Teams to our Olympic Team.

Besides our success with the Senior National Team, I am most proud of the pipeline that has been established. The team that is preparing right now for Beijing is a "pipeline team" that was started in 2001.

I spend the majority of my time in the first two years of the quadrennial focused on the pipeline. The Senior Team has a less extensive training and competition schedule which means there is more time to work directly with the pipeline. I strongly believe that we need to make much more progress with our pipeline in 2009 and 2010, so we can have a strong Olympic Team in 2016. The pipeline will be the top priority in the first two years of the next quadrennial. I have a sense the rest of the world is catching up to us and we need to make a significant move forward.

All our Age Group National Team staffs do an excellent job of teaching our terminology, methodology and technical and tactical system of play. From the first day an athlete enters our pipeline they are taught the USA Women's Water Polo system.

5. As a Coach, how have you changed over the years?

I would say I have become more patient over the years. I have gained a lot of experience over the last ten years. Ten years is along time to be a National Team Coach and I know so much more now than I knew when I started. The experience can have a calming effect and I believe I have a better understanding of how to get a team prepared for a major event.

In addition; I delegate a lot more than I used to. I have an unbelievably great staff. All three are excellent coaches who each have major responsibilities in the training of the team. Also it should be re-mentioned our pipeline has been very effective. By the time an athlete makes the Senior National Team, they already have a very strong foundation of our system. This makes the job a lot easier.

6. What was the best piece of advice that you have received?

I have received so much great advice over the years. I have had the opportunity to work with great coaches, players, administrators and colleagues. Each has had an impact on my philosophy as a coach. Two things I always try to remember; keep it simple and keep an open mind.

7. What advice would you give to a young coach?

I think the goal of each training session is to improve. No matter the age group or level of play. Create an environment that expects, encourages and recognizes improvement.

Have a plan for each practice; determine the specific goal(s) for each practice. Also, as I discussed in the first question always remember a coach of younger athletes has a tremendous influence on their athletes.

Developing Your Coaching Philosophy

By Heidi Thibert
US Figure Skating

The first week of June, US Figure Skating and the USOC sent me, and PSA sent Kelley Morris-Adair and Carole Rossignol to the National Coaching Educator's Conference. We attended many wonderful presentations designed to create programs within sporting organizations with the purpose of continuing education for coaches in all sports. The National Association for Sport and Physical Education has published the ***National Standards for Sport Coaches*** *"to provide direction for coaching educators, sport administrators, coaches, athletes and their families, and the public regarding the skills and knowledge that coaches should possess."* Over 100 sport organizations agreed that a core body of knowledge existed from which to develop coaching expertise. The 37 STANDARDS, grouped into eight DOMAINS, identified the scientific and practical competencies.

The first DOMAIN identified is Philosophy and Ethics. The National Standards state that "it is imperative that the coach establishes a coaching philosophy that focuses on the safety, development, and well-being of the athlete. As a key leadership figure, the coach must model and teach appropriate behavior in all aspects of coaching and maintain ethical conduct during practice and competitions." This article will focus on the development and implementation of an athlete-centered coaching philosophy, which is the first STANDARD.

"A well-developed coaching philosophy provides expectations for behaviors that reflect priorities and values of the coach. An appropriate coaching perspective focuses on maximizing the positive benefits of sport participation for each athlete." -

NASPE National Standards for Sport Coaches, 2nd Edition

The National Standards BENCHMARKS for developing a coaching philosophy are:

- Identify and communicate reasons for entering the coaching profession.
- Develop an athlete-centered coaching philosophy that aligns with the organizational mission and goals.
- Communicate the athlete-centered coaching philosophy in verbal and written form to athletes, parents/guardians, and program staff.
- Welcome all eligible athletes and implement strategies that encourage the participation of disadvantaged and disabled athletes.
- Manage athlete behavior consistent with an athlete-centered coaching philosophy.

A coaching philosophy that is well-thought out clarifies many aspects of the coach's delivery and presents a consistent and positive message to the athletes being coached. Coaches carry out our roles based on our experience, knowledge, values, opinions and beliefs. With that in mind, each one of us that coach need to take the time to think through and formalize our personal coaching philosophy. *So how do we develop a coaching philosophy?*

START AT THE VERY BEGINNING, A VERY GOOD PLACE TO START

According the experts in the field of coaching, to develop a formal coaching philosophy, start by creating a coaching philosophy document that states the goals of: improving coaching skills, improving coach/athlete satisfaction, and improving athletic results.

The late great Canadian coach, Frank Reynolds teaches us that, to be successful in the coaching field, use three components to guide you, and adapting them to skating, they would look like this:

1. Know yourself as a coach: your strengths, weakness and areas requiring improvement.

2. Know what you are up against and the obstacles you may encounter in coaching.
3. Understand your athletes, their personalities, abilities, goals, and why they are in the sport.

WHAT KIND OF COACH AM I?

It takes an honest self-assessment to admit to having weaknesses, but of course, we all have them. It is just best that they do not interfere with good coaching judgment. If you emphasize your strengths, you will be able to identify consistent ways to coach that best utilizes those strengths. To find out what your coaching strengths are, you can ask yourself a few questions: Are you?

- A former athlete, a natural teacher, or dynamic motivator, or efficient communicator?
- Easy going, energetic and dynamic, serious and strict, or outgoing and friendly?
- Perceived by others the same way you perceive yourself?

The opportunity to make a full assessment of your strengths and weaknesses and recognizing your morals, values and beliefs, you are better able to adjust your style of coaching to the athletes you are coaching. At the same time, you will answer the important questions on why you chose to be a coach, how you communicate and produce as a coach and what goals objectives you have as a coach. The saying is that "Self-knowledge leads to self-confidence", and you want to radiate what your values are.

WHO AM I COACHING?

With regard to your background and experience and the athletes you work with, it is equally important to understand the perimeters of your coaching context. You need to have a good understanding of the age, gender and training level of the athletes you work with. You can ask yourself several questions to answer those questions:

1. How much time do you have to devote to coaching?
2. What is your coaching commitment level?
3. How much time do your athletes have to devote to train and compete?
4. What is the level of commitment that your athletes have?
5. What are the stages that your developmental clientele currently in?
6. What resources do you have available to help your athletes by enhancing and incorporating other aspects such as sport psychology, nutrition education or sophisticated technique analysis (i.e. Dartfish, etc.)?
7. What are your short-term, intermediate and long-term goals for your athletes?

Undoubtedly, there may be other restrictions that will affect your coaching effectiveness, such as competition with other sports, school pressures and outside activities, even parental interference. Knowing what else is out there enables you to create your annual training program to the specific needs of the athletes you work with. By understanding the outside influences that will affect your coaching, you can incorporate into your coaching some policies on safety, training habits, and behavior, and adapt to the fact that others make decisions that affect you and your athletes. Relationships with parents can be stressful, and a clear plan on how to deal with an irate or manipulative parent will minimize or avoid a reaction that might make matters more difficult for you. By developing your coaching philosophy to encompass the coaching environment you are in, you can become more effective, productive, and minimize obstacles and other difficulties.

Communication is a vital aspect in your relationships with your athletes. It is very important to talk to your athletes individually to determine what their values and beliefs are, what their goals are and why they are participating. As a coach, you are a powerful role model and can have a tremendous influence on your skaters if you and your athletes are on the same page. Just as you examined your own values, beliefs and habits, take the time to get to know each of your athletes. Once you know and understand each of your athletes, their strengths, weaknesses abilities and skills, then develop an approach to coaching them. Will you focus on the stars? Will you treat everyone equal in terms of your attention and help? Are you into the team coaching approach, or do you prefer to be a solo act? Questions like these are important to identify your unique style of coaching.

THE JOURNEY IS THE PRIZE

How you as the coach view the results of both training and competition should be a major point of every coaching philosophy. Not many athletes are realistically "Olympic-bound," and educating athletes that it is more important to focus on their process of development and how they performed in the competition, rather than the results that they achieved, cannot be emphasized enough. In an athletic competition there can be only one first place. Does that mean everyone else is a loser? Of course not! Therefore, to build confidence and to see measurable progress, and to learn positively from mistakes made, coaches should focus on the process and not the outcomes with athletes. Encourage the athletes and parents to follow your lead. Because the outcomes are obvious, it takes extra effort from the coach, parent and athlete to see the benefit and results of the process of preparing for the competition.

CONCLUSION

Whether we take the time to design a coaching philosophy or not, all coaches operate under a coaching philosophy of some kind that is defined by our actions and beliefs. It can happen by default, or it can happen by a plan that will create a coaching roadmap for you that is realistic and rewarding for both you and your athletes in the form of improved performance. Coaching is all about helping athletes achieve their dreams. It should be done positively, intelligently and with dedication. The positive coach and role model, following a well defined coaching philosophy will be a key ingredient in the success of his or her athletes. For that reason alone, the development of a formal coaching philosophy statement is an essential first step for all coaches.

Increase your Legal Knowledge

Negligence Law and Defenses

By: Dr. Athena Yiamouyiannis- Ohio University

Significant media attention has focused on sport accidents and incidents that have occurred on the playing field (e.g. deaths to athletes due to heated-related illness, serious injuries due to improper instruction or supervision, accidents related to unsafe playing conditions). At the high school and college levels, negligence liability is the area in which the greatest numbers of lawsuits are based (Cotten and Wolohan, 2007). As a coach, you could be personally sued if an incident occurs involving one of your athletes; it is therefore important for coaches and sport leaders to better understand legal concepts and preventative approaches that can ensure safer playing conditions and reduce personal and organizational liability.

NEGLIGENCE

What is negligence? Negligence is an unintentional wrongdoing committed by an individual or organization that results in harm to another person (or their property or reputation). In order to determine whether negligence has occurred, the following four components are examined:

1. **Duty** – Were you performing your duties as coach when the incident occurred?
2. **Breach of Duty** – Did you fail to protect the athlete against unreasonable harm?
   (How would a reasonable coach with similar skills and knowledge have reacted?)
3. **Proximate Cause** – Is there a reasonably close connection between your conduct and the resulting injury?
4. **Harm** – Was the athlete actually harmed? Bodily injury? Emotional harm? (If there is no harm, then there is no liability.)

When an athlete becomes injured as a result of a coach failing to protect their athlete against unreasonable harm, negligence is considered to have occurred. Negligence is state law, and, depending up on the situation, the coach (or school/organization) could be held legally responsible and made to pay compensatory damages (e.g., medical bills, economic loss, compensation for pain and suffering) and in some cases punitive damages awarded as punishment in cases of outrageous conduct to deter this from happening again.

DEFENSES AGAINST CLAIMS OF NEGLIGENCE

What defenses (protections) exist for coaches and schools/organizations accused of negligent behavior that resulted in athlete harm? Some of the defenses that can be used in a court of law against claims of negligence include the following:

1. Volunteer Immunity – Under the Volunteer Protection Act of 1997, volunteers are immune from ordinary negligence (but not from gross/extreme negligence). [Note: This law was adopted to encourage people to volunteer for nonprofit organizations.] Good Samaritan laws are also in place to protect those individuals who may attempt to provide assistance in emergency situations, such as administering First Aid or CPR.

2. Sovereign and Governmental Immunity – Public agencies may be protected from legal liability depending upon the situation. For example, a school district in the state of Ohio used sovereign immunity as a defense in a court case in which a 15-year old boy who was pitching in a batting cage was injured by a ball that ricocheted. A lawsuit was filed by the boy's family against the school district alleging "breach of duty" claiming that instruction on the proper use of the batting screen and proper supervision was not provided. Under the sovereign immunity defense, the court found the school district immune from liability for the injury. (Gym2Jury, Vol. 19, No. 1 -- Elston et. al. v. Howland Local Schools.)

3. Waivers – Did the athlete (or parent of athlete) sign a waiver? What type of waiver was signed? Did the waiver include language indicating a relinquishing of rights to pursue legal action? Did the waiver include language indicating an awareness of inherent risks to participation in the activity? [Note: Negligence is a state law and its application varies from state to state. In some states waivers carry significant weight, whereas in other states, if negligence has occurred, even a signed waiver may not carry much weight.]

4. Ultra Vires Act – An Ultra Vires Act may be used as a defense by the employer but may not be used as a defense by the employee. In short, if the coach acted outside the scope of their job duties which resulted in a negligent act, the employer might be off the hook, but the coach would still be held responsible.

5. Contributory/Comparative Negligence as a Defense – Was the athlete partly to blame for the injury? If so, what percentage were they at fault? Contributory and comparative negligence may be used as a defense to reduce the amount of liability.

Having a better understanding of legal concepts related to negligence liability can help coaches at all levels be better prepared to prevent such occurrences as well as to be aware of protections (defenses) that exist.

PREVENTATIVE APPROACHES

In addition to using good judgment and common sense, there are a number of preventative approaches that coaches can take to reduce the likelihood of sport accidents and incidents, thereby reduce the amount of risk. Some examples are as follows:

- Conduct a pre-season meeting indicating assumption of risk
- Have participants sign waiver forms
- Require physical exams of all sport participants
- Have medical information on hand during practice and competition
- Walk the facility before practices and competition & check equipment regularly
- Get background checks on assistant coaches
- Consider personal liability insurance
- Institute transportation safety practices

Having a better understanding of legal concepts related to negligence liability can help coaches at all levels be better prepared to prevent such occurrences as well as to be aware of protections (defenses) that exist.

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5 Fall Super Foods

that will help boost your immune system and keep you healthy…

By Adam Korzun
USOC Performance Services- Sport Dietician

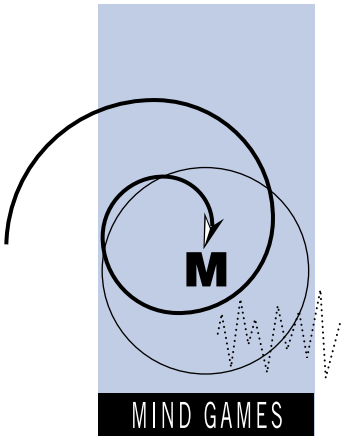
1. Flax Seeds – With its first culinary use reported in ancient Greece, flax seeds are further proof that great things can come in small packages. Flax seeds are high in the omega 3 fatty acid, ALA, which is actually converted in the body to EPA, the same heart healthy omega 3 fats found in fish. In addition to omega fats, flax contains folate, B-vitamins, magnesium and lignans which make it an immune boosting antioxidant that can protect your heart, eyes, bones, brain, digestive system and can even have an anti-inflammatory effect. Since the whole seeds are indigestible, they must be ground to allow for absorption of all of its nutrients. So, add a tablespoon of ground flax to your smoothie, oatmeal, peanut butter sandwich or even when baking to supercharge your meal and your health.

2. Yogurt – While everyone has likely heard that yogurt contains probiotics, the addition of protein, calcium, potassium, vitamin B12 and zinc move this food up the medal stand. Probiotics are a "good bacteria" that help maintain proper function of the digestive system, assist in absorption of nutrients and prevent harmful bacterial growth and boost immune function. Now, add the protein for muscle development, vitamins and minerals for bone health and not to mention antioxidants; you have a super food on your hands. So next time you are looking for a dessert; try some yogurt with fresh fruit, granola, or even cookie crumbs to make your dessert good and good for you!

3. Quinoa – Now grown primarily in the Colorado Rockies, this ancient grain of the Incas has managed to fly under the radar until now. Quinoa is rich in iron, magnesium, copper, phosphorus and oh yeah, did I mention it is higher in protein than any other grain? Quinoa is about 16% protein where rice is only 7%. But quinoa isn't just high in protein; it is a complete protein, which means it contains all of the essential amino acids. Of those essential amino acids, it is particularly rich in lysine which is essential for tissue growth and repair. Need I say more?

4. Beans – They haven't been called the magical food for all these years for nothing! Beans are actually rated in the top 20 by the USDA and Journal of Agricultural Food Chemistry in the most antioxidant rich foods. A great source of protein, iron, fiber, folate, magnesium, potassium, B-vitamins, copper, phosphorus, and molybdenum (which is a component of sulfite oxidase that acts to detoxifies the sulfites found in food preservatives); it is no wonder Jack traded his cow for beans. So whether you eat them in a soup, on a salad, in a wrap, as part of a burrito, as a hummus or as Boston baked beans; beans are a world champion super food (Go Red Sox)!

5. Salmon – Sure, it can be a hassle to drive 30 minutes across town to buy fresh fish, but consider the fact salmon spend its whole life swimming thousands of miles upstream just so it can lay eggs; it makes the drive to the market seem like nothing. Rich in omega 3 fats, protein, vitamins D, B3, B6, B12, magnesium, and selenium, salmon helps protect your heart, brain, eyes, bones, helps manages blood lipid levels and can even reduce inflammation. When was the last time a meal did all this for you? It definitely makes the $9.99/lb seem like a bargain for that type of nutrient dense punch, doesn't it?



Make Mental Training Part of Physical Training

by Suzie Riewald, Ph.D.

The coach's eyes are fixed on Courtney as she climbs the ladder to execute her last dive, a reverse one-and-a-half tuck. When she reaches the board, she takes two deep breaths, closes her eyes, and puts her arms out to the side as she would in preparation for the dive. She is rehearsing the dive in her mind, seeing and feeling herself execute a flawless reverse one-and-a-half tuck. Courtney and her coach have worked on this rehearsal strategy for months; she mental "dives" prior to every real dive in both practice and competition. Imagining the dive is an additional form or practice and gives Courtney confidence to focus on making each dive her best.

All coaches and athletes understand the importance of training the mental aspect of performance. The mind can have a positive (or negative) influence on how athletes perform. However while many coaches recognize the importance of a strong mental game, they may not be comfortable with teaching mental skills. One remedy for this situation may be to have a sport psychologist develop and implement a psychological skills training program. Unfortunately, few programs/coaches have access to sport psychologists; therefore, coaches must take responsibility for physically, technically and psychologically preparing their athletes.

You don't have to be a psychologist to set up a psychological skills training program. First, it is not necessary (or realistic) for the program to be comprehensive, Second, with just a little planning, you can combine basic mental training principles and techniques into daily practice sessions. When the coach stresses the importance of mental training, it may be more effective than when mental training is a separate component of practice, delivered by an outside consultant.

THE PROGRAM

Focus on specific practice goals. Goal setting clearly has a positive effect on sport performance. Goal setting helps direct attention and increases motivation and persistence. Despite the benefits, coaches often balk at developing systematic goal setting programs because they believe there is not enough time to structure such a program, especially when coaching a large team.

Fortunately, the benefits of goal setting can be realized without a large commitment of time. Coaches should discuss specific goals with athletes prior to each practice or drill—telling them where to direct attention and focus efforts. This can be done during pre-practice stretching and will help prevent aimless practices, direct attention towards relevant skills and build confidence as the athletes evaluate their performance and note improvements.

Randi, a tennis coach has developed a drill to work on Troy's foot movement between shots. While his execution of strokes is important, she directs Troy to focus his efforts on his footwork which has cost him several points in recent competitions. By doing this, he has a specific area on which to direct his attention, and he can also evaluate his practice performance based on how well he moved between shots. Additionally, having focused on this skill in practice and noted improvements, Troy will have confidence that his improved footwork will be an asset in competition.

Use imagery to complement physical practice. Imagery is also a psychological skill that can be refined through daily practice by using all the senses to create or recreate an experience. Imagery helps build confidence, perfect skills, familiarize oneself with the various elements of performance (i.e., race course, pre-competition plan) and motivates by calling to mind images of future success. Furthermore, and contrary to what is believed by some, using imagery does not require an individual to sit for 15-20 minutes in a quiet environment. Once athletes have a basic knowledge of the skill, it can be easily included in practice.

To include imagery in practice, coaches should direct the athletes to mentally practice each skill prior to physical execution—be sure to provide athletes with cues to make the imagery as real as possible and to direct their attention to important elements of the skill. Athletes can also use imagery in practice to simulate competitions. The coach can direct the athletes to image the competitive environment and their "game plan" as the team prepares for an upcoming competition.

Barbara, a long jumper, is directed by her coach to image the perfect jump prior to each execution. She is told to feel the speed as she sprints down the runway, see herself hit the board, feel the power on take-off and movement while airborne, then see and feel the perfect landing. When she completes the jump, her coach helps her correct her errors using imagery. After her first jump, he tells her she needs to accelerate through the next-to-last step and directs her to see and feel this change in her mind before her next jump.

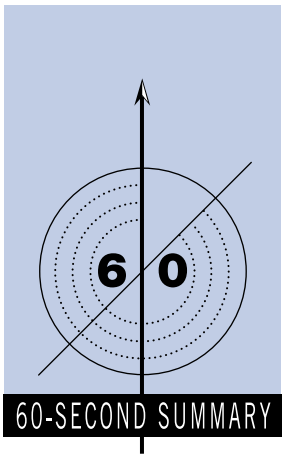
Use positive, appropriate coach behavior when interacting with athletes. All coach education programs promote and encourage a positive approach to coaching. Does this mean coaches should never yell or critique an athlete's performance? Of course not. In some situations, yelling may be necessary to get the athletes' attention. Critiquing or evaluating helps athletes learn from mistakes. It must be communicate, however, that you are critiquing the performance, not the athlete as a person, and that such evaluations are necessary to make improvements.

One way to communicate effectively with athletes is the "sandwich approach" which involves sandwiching the critique or feedback between positive statements.

One way to communicate effectively with athletes is the "sandwich approach" which involves sandwiching the critique or feedback between positive statements. For example: "Great hustle on that play, Greg (positive). You ran the ball down but took your eye off of it at the last second. Next time, follow the ball all the way to your glove (critique). You can do it! (positive)" Such and approach communicates the error or mistake to the athlete but does so in a supportive, encouraging, non-threatening manner.

Athletes look to their coaches as models of thinking and behavior. If the coach expresses doubts, either verbally or nonverbally, the athletes will pick up on this and also start doubting. Or, if the coach acts frustrated or upset, the athlete may see this type of behavior as appropriate when coping with challenges. Coaches, therefore, must be aware and control their verbal and nonverbal behavior to serve as an example for their athletes.

With a little thought and creativity, numerous mental training activities can become a regular part of daily practice. To begin, coaches must understand these skills and use them with a goal of educating their athletes on the mental aspects of performance.
Reprinted from Olympic Coach magazine- Winter 1996



"Amplification of Error": A Rapidly Effective Method for Motor Performance Improvement

by Chiara Milanese, Gabriella Facci, Paola Cesari and Carlo Zancanaro

The Sport Psychologist, 2008, 22 164-174.

REVIEW

Coaches need lots of different tools in their toolbox when working with athletes. Feedback tools are critical, as what, how and when we provide feedback can determine the success of a performance. As a coach, one of the most difficult if not frustrating situations is working with an athlete to change a skill that was learned incorrectly. Hours and days may be spent trying to get the athlete to "feel and learn" the improved action.

The idea of practicing motor errors to assist in learning or refining a motor skill has been studied for quite sometime. The concept has been reviewed with different names: "teaching backwards", "reverse teaching progression", "negative practice" among others. The Method of Amplification of Errors (MAE) is another tool for the toolbox of teaching skills.

TYPES OF FEEDBACK

The authors talk about feedback as either descriptive or prescriptive. "A descriptive feedback (DI) statement merely indicates something about what the learner did (e.g., that's wrong, don't do it that way). Prescriptive feedback provides learners with information they can use to make corrections in their movement (e.g., do it this way)". It's like the Little League coach who yells to the pitcher "Johnny, pitch strikes" (as if the child wants to pitch balls) versus "Johnny, remember to step off the mound". "Research suggests that prescriptive feedback is more useful to learners than descriptive feedback (Newell & McGinnis, 1985).

THE METHOD OF AMPLIFICATION OF ERROR

Method of Amplification of Error (MAE) states that "Consistent, habitual errors indicate the presence, rather than the absence of learning. With MAE, what matters is that the participant knows how to perform the movement incorrectly: one can say that mistakes represent the limits of the participant's of knowledge about one specific movement. According to Ausubel (1968): "The single most important factor influencing learning is what the learner already knows. Ascertain this, and teach her/him accordingly".

The key for the coach in this method is being able to identify the principal error. The idea of MAE is that if the athlete amplifies the principal error in a skill, then they will have a "better understanding of what not to do, therefore they are more capable of readjusting the entire motion". The athlete feels what happens when they have done it incorrectly and can make adjustments.

The authors used the standing long jump with their 13 year old group and here is an example of the two types of feedback provided. This study was comparing the effectiveness between the two types of feedback (MAE v. DI). Remember, MAE is focusing the athlete on making the error, so that they can un-learn the action.

Error Analysis	MAE Feedback	DI Feedback
The trunk is overinclined in a forward direction. No or too little bending of the legs	Increase the flexion of the trunk and keep the knees and ankles almost extended.	Decrease the flexion of the trunk and increase the bending of the legs
Both feet takeoff before trunk and legs reach the maximum extension and alignment	Push using only the feet, keeping knees (thigh) and hip (trunk) at a fixed angle	Before taking off extend completely the trunk and legs

" Taken together, the results of this and previous research suggest that MAE is an effective technique for correcting the patter of motion quickly in a short time; in contrast, conventional approaches of error correction usually take longer than than one session".

KEY POINTS FOR A COACH USING MAE

"1. Identify and diagnose the principal learned error, i.e., the factors that represent the main cause and not the secondary effects of the movement.
2. Choose the "principal error"i.e., the one that primarily affects the integrity of the structure and performance of the movement;
3. Deliver the correct "value" in term of joint amplitude, needed to adapt the action."

"Amplifying the participant's "main" error in a given motor skill allows him or her to better understand what is not-to-be-done, thereby enhancing the correction of motor errors… The different approach of MAE is that it is an unlearning task rather than a reteaching one. In this way the participant deletes forever the error with a full transfer of learning, without the need for the customary adaptation period."

HOT OFF THE PRESS

Coaching Athletes with Disabilities: A 12 Step Approach by Robert Gailey
Gailey provides some insights in working with athletes with physical disabilities.
http://www.oandp.com/edge/issues/articles/2004-04_03.asp

The Relationship among Coaches' and Athletes' Perception of Coaching Staff Cohesion, Team Cohesion, and Performance by Zakrajsek, et al
Study showing that Coaches' and Athletes' perception are many times not the same and can be a factor in performance
http://www.oandp.com/edge/issues/articles/2004-04_03.asp

Expert Performance and Deliberate Practice by K. Anders Ericsson
Short article describing the concepts by leading researcher K. Anders Ericsson
http://www.psy.fsu.edu/faculty/ericsson/ericsson.exp.perf.html

Competition-specific preparation and expert performance by Eccles, Ward and Woodman
Competition-specific preparation appears critical to performance in sports in which environmental constraints change considerably between competitions.
http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6W6K-4S575WP-3&_user=3890777&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_acct=C000061693&_version=1&_urlVersion=0&_userid=3890777&md5=9241b5dbee7aa2db1e312d74b409f5f5

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OLYMPIC COACH E-MAGAZINE

The U.S. Olympic Committee Coaching and Sport Sciences Division reminds you that our quarterly magazine, OLYMPIC COACH, is now available electronically as the OLYMPIC COACH E-MAGAZINE.

This quarterly publication designed for coaches at all levels can now come to you via e-mail. The quarterly e-mail provides a summary of each article in the magazine with a link that takes you directly to the full-length article. The best news is that OLYMPIC COACH E-MAGAZINE is available to all coaches and other interested individuals free of charge.

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