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## THE Theory of Motor LEARNING

Part 1 & 2  
by Michael Brooks

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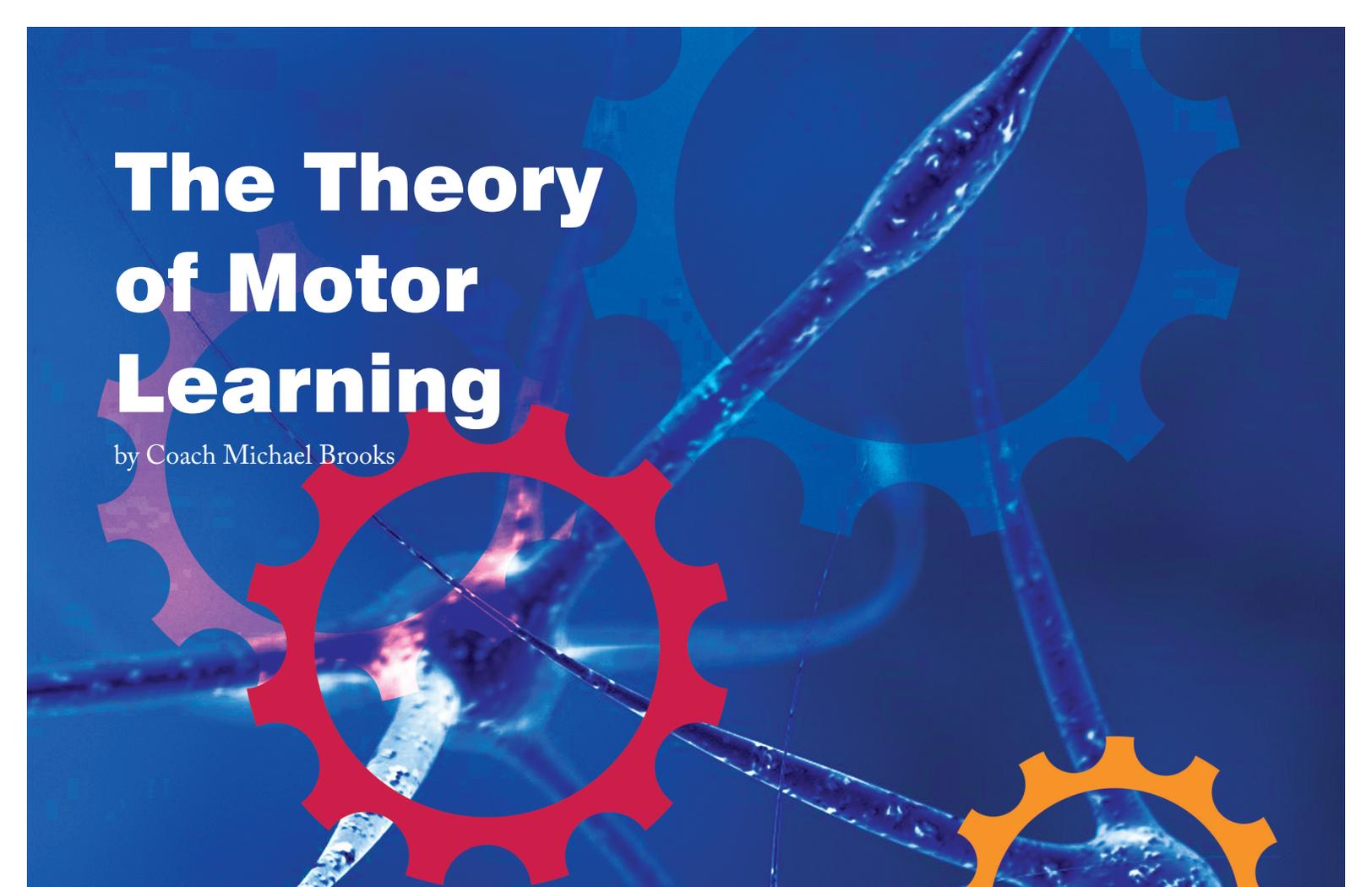
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# The Theory of Motor Learning

by Coach Michael Brooks

## Part 1

*Presented by Michael Brooks, North Carolina Aquatic Club*

[Introduction by Kathleen Prindle]

Hi, everybody, welcome. We are going to go ahead and get started. For those that don't know me, my name is Kathleen Prindle. I am the Vice President of the ASCA Board of the Directors, and am completely thrilled today to be able to be announcing Coach Michael Brooks. I'll start by reading his bio for you. I need my glasses.

Michael Brooks has been the Head Coach of York YMCA Swim Team in York, Pennsylvania since October of 2006. In that time, in addition to scoring at the major domestic meets, York Y swimmers have represented the USA internally at meets ranging from Junior Worlds, Youth Olympics, Junior Pan Pacs, Pan Ams, and various World Cup Meets. Four of his swimmers have been named to the USA Swimming's National Junior Team and two to the National Team. The York Y was named the Gold Medal Club in both 2013 and 2015. This is really notable because York YMCA is the smallest sized club to get a gold medal award from USA Swimming. It's a huge accomplishment. In 2016, the York YMCA girls won the team title at the YMCA National Championships.

As of last week, the move has been official. Coach Brooks has taken the Head Coach position at the North Carolina Aquatic Club. So, they're really lucky to have him over in North Carolina now, although my husband is from York. So, I won't get to see him as much when we go home to visit. So I'm sad.

He is a featured speaker at several major coaches' clinics across the country and Canada. He has spoken on wide-ranging topics, such as creating a culture of excellence, teaching technique, coaching effective practices, age group coaching for long-term success, coaching swim parents, creating talent in a small town, coaching IMers, coaching everything basically, and engineering success for age groupers at meets. In addition, he has taught the ASCA Stroke Technique School three times and the Physiology School once.

Coach Brooks has been named Coach of the Meet at the YMCA National Championships four times, Mid-Atlantic Senior Coach of the Year twice and Maryland Age Group Coach of the Year twice. His swimmers have raced to 50 plus YMCA National Titles and over 200 National Top 16 and Top 10 rankings.

Before coming to the York Y, he spent two years as the Head Age Group Coach of the Brophy East Swimming Team in Phoenix, Arizona, working closely with the great Dennis Pursley. And before that, he spent five years as Head Coach of the York site of the North Baltimore Aquatic Club, where he had the good fortune to work with and learn from both Murray Stephens and Bob Bowman.

You guys are in for a real treat today. This man is brilliant. He's one of the most brilliant coaches of our time in my opinion. If you haven't read his book, I will shamelessly plug it. It's called "Developing Swimmers". It's fantastic. One of the best books I've read in our industry about developing swimmers. So, I'd like to welcome Coach

[Michael Brooks]: Thank you.

Well, thank you very much, Kathleen. I liked like to thank ASCA and John Leonard for allowing me to talk. It's always a bit nerve-racking at least for the first few minutes, but after a couple of minutes I'll settle down and we'll just get down to business. I wanted to start, if we can get this work, with the star of the show. There it is. That is a tiny sliver of a mouse's cortex, so part of a mouse brain. A tiny, tiny sliver. And despite its tininess, there are hundreds of thousands of little connections, just in this slit of the brain. When you consider that a mouse's brain is about that big and our brain is this big, and there are hundred trillion connections... well, you got the picture.

What we're trying to do when we teach stroke technique is to rewire that thing and make those wirings and the connections stable enough that kids can swim beautifully, effectively, efficiently, consistently, at race speed.

I have two talks today, both of them are--each is for an hour. I'm probably going to run a little long on the first one, and I'm probably going to start a little early on the second one. I'm going to try and finish the second one on time, so I don't bleed into the next speaker, but there is a lot to talk about. And I understand that a lot of what I say will appear, maybe even heretical but, you know, even if something rubs you the wrong way, just take a few deep breathes. Give me a hearing and if you have questions, please ask them. You don't have to wait until the end of the talk to ask questions. Because if you're stuck, I want you unstuck so that the rest of it makes some sense.

I have a bit of a cold right now, so occasionally I will clear my throat. Apologies in advance. And my suggestion is to take notes. Even if you don't like taking notes, because if you don't, within approximately three hours of the finish of my talk, you will only be retaining at most 50%. After about three days, you will have lost 90% of what I'm talking about. When you take notes, you're going over the ideas in your head and trying to figure out what's important and what isn't, and that helps the retention enormously. So, suggestion, take notes. I will have a PDF available of a summary of it, but I hope that's more a complement to what you do now and the thinking that you do now. Kathleen already told you who I am, so I won't get on to that. But a few quotations to set the scene that I think are pretty important. John Wooden, the legend, "The proper execution of fundamentals can become instinctive if--underline if-- taught properly, just like breathing or walking." Percy Cerutti, he was an Australian track coach, again legendary, "Forming the correct neural patterns is 80% of winning on the highest levels of competition." And last from someone still around, Sean Hutchison, a friend of mine, "Bad strokes, bad coach."

Now, some of those are a little more abrupt and extreme than others, but, I think they do well to set a standard that we should try and hold ourselves to. The translation from all of those put together at least as far as I can see is, if we do our jobs better, kids will swim a lot faster. So, that's the basic point here. And as far as technique goes, I think the situation right now is that most kids train ugly, and most kids race ugly.

If you go to just about any practice and watch, and you have a real and refined sense of beauty, it's difficult. And, if you go to any meet, and this even includes a national championships, the technique is fairly poor, I think. Probably, if we want to search down to the root of the problem, it's us. We're not doing a good enough job at teaching skills and getting swimmers to retain those skills at the most important times when they are racing. It's not looking really



pretty for a 25 here or there. It's being able to race on a very efficient stroke from the first to the last stroke of a race under the most trying circumstances, say Olympic Trials.

Now unfortunately, I didn't do a very good job at that last one this past summer, so I definitely have a long way to go on this and I don't say that I have come up with all the answers because to me this is sort of like the holy grail that I've been searching for, for a long time. And if you're familiar with medieval romance, you know, they never found it. So, I'm expecting that this quest will go on as I try and figure out the answers.

I think that swimming is a technique-limited sport, by and large. Which means that the study of motor learning, which is how the body learns motor or movement skills, should be primary in the education of coaches. But, I won't ask right here, I've given a decent number of talks on technique and teaching technique and what have you, and I usually ask how many of you are familiar with max VO2 or anaerobic threshold, and almost every hand will go up. I'll ask how many of them of you are familiar with random practice or variable practice and there will be maybe one out of hundred. Well, if teaching skills is what we're supposed to do, that's our biggest job, then we need to know this field. Motor learning should be crucial.

You know, I was fortunate to have a brother who is in Physical Therapy Graduate School and he pointed me in this direction. Up until then, I was always a physiology guy, you know, train these kids, get their max VO2s and lactate, all the rest of that. And now, I look at swimming, I look at practices very, very differently and I think, I hope, a little bit more comprehensively than I did in the past.

Now, I am not going to be discussing the perfect butterfly or perfect strokes or anything like that. What I am going to talk about is how we most effectively teach skills and get them to stick.

So, I'm aiming for a program of technical development that is relatively simple. It might not sound like this, this first time through for you, but once you get familiar with it, it is that simple and cheap because not very many programs have tens of thousands of dollars to buy the most advanced technology. It's got to be something that anybody can do if it's truly going to be practical.

Second, it's got to be practical for everyone from 10 and unders up through seniors. I think that my assistant coach, John Nelson at York, and I have spent a lot of time trying to make sure that we can do this with every level, every age of kid in a developmental program.

And last, it's got to be able to work with a group, because very few of us have the luxury of being able to do one-on-one private lessons very often. We work with training groups. Sometimes, there are huge training groups, sometimes the range of abilities is huge, range of ages and thus, biological needs---very different. So, we've got to be able to work with a group and a program has got to be able to work with a big group.

Brain cells in swimming. You kind of got a little tiny, tiny picture of

a very simplified part of a brain. Our brains are 10,000 times more complicated than that. And, kind of a subtitle for this section of the talk is the Power of Bad Habits or Why It's So Hard to Change.

Practice makes permanent. And swimmers' bodies learn from every length that they swim. They are adapting continually to what you give them to do. With swimming, it's a very peculiar type of sport. If I'm playing volleyball, I might do 10 or 15 spikes in a day of practice. But if I'm a swimmer, I'm going to swim several thousand strokes. Over the course of the year, I will swim millions of strokes. If I'm swimming millions of very poor, ugly, ineffective strokes, then I have made those ineffective stroke mental or neural patterns very strong, practically resistant to change.

That is a real problem. We have made these bad strokes overlearned, habitual, and normal. It feels totally normal for a poor swimmer to swim poorly. So it is very difficult when you're not necessarily teaching somebody a skill for the very first time, which is relatively easy. You're trying to change something that is overlearned and very stable. Changing strokes really means rewiring those neural connections in the brain. I like to think of it as — the analogy as a superhighway versus a cow path. You know, the superhighway has eight lanes, beautifully asphalted, no speed limit, a Starbucks every few miles. Those are nodes of Ranvier for the neuroscientist here. It speeds everything up a little bit.

It's easy to go down that superhighway. And if you want to get from A to B fastest, that's the way to go. That's the lousy stroke that a swimmer is practicing every single set. If we want to make a stroke change to a skill, so make a skill change. We're going through this cow path that's overhung with thickets like the Amazon rainforest, and we've got to take a machete and just blitz out every single step that we take. And it's going to be easy to go to take the path of least resistance and go down the superhighway.

We've got to convince the swimmer that it's in his or her best interest to take the cow path no matter how hard that is. And the more often we can get the swimmer to ignore the super highway, the Starbucks' will go out of business, you start to see potholes and next thing you know it's not nearly as efficient and easy to go down that road. The more we take this cow path, the more we've cleared it, the better we've grooved this path and the more like a superhighway we are making that new stroke skill.

So, superhighway versus cow path. Those are the competing patterns or networks that we're dealing with and we need to basically make this one into this and make this one into this, if we want to get kids to truly change what they're doing.

If a stroke change is properly understood, it takes a long time because new neural patterns are very fragile and subject to erasure. It takes a long time and a lot of very precise, probably easy swimming to groove in that new stroke pattern. Usually, neither coaches nor swimmers have the true patience to let that happen. We want to get back to work because we're worried that kids are going to get out of shape and I am too, and I do too. I fight that as much as possible.

Further, this is really important. These new stroke patterns are not really learned until they are stable, consistent, and they are resistant to interference, and stable under training and racing stress. So many coaches and so many swimmers work on something that's a problem and they'll swim in 25 and they'll say, "Ah-ha! I got it, I did it right!" And the coach will say, "My job is done." Well, that's the first necessary, but only the first of about 10,000 steps to getting a swimmer to actually be able to race at the national championships under tremendous stress and hold that stroke from start to finish. So, it is that first, first step. And it is very easy, and very common to train a stroke change right out of a swimmer.

For instance, if you spend say 20 minutes working on technique, skills on say freestyle and then you go right into 20 X 200 on 2:30,

fastest average, try and hold your new stroke. Ready, go. That new stroke change will last for approximately four seconds and after that, it is back to their old normal, ugly, ineffective stroke and you've just wasted those 20 minutes. And then, when the swimmer looks terrible, you get mad at him, "Well, why didn't you focus on that?" What the swimmer should say, but never does, because they don't know enough neurosciences. "Coach, you're a dunderhead and you didn't give me the right stuff to do." So, what we make sure we do is protect any gains that we've made. I mention this several times throughout this talk and the second part.

If I'm working on technical skills in a particular stroke, that's what I do that day and I don't train anything on that stroke. Nothing hard at all, period. Because I want to protect any gains we might have made, presumably have made, I assume we have made, and then give those changes a chance to stabilize a bit. It's called long-term memory consolidation.

So anyway, our job is really difficult. When you look at just by experience, everybody knows how hard it is to get kids to change their strokes, and when you start looking at the science both motor learning and the neuroscience underlying it, you realize why it's so hard. It takes a long time. You've got to be very, very patient because we're not just changing a swimmer's freestyle, we're changing their brain, we are rewiring it. That takes time.

Now, getting to more of the fun stuff. Foundational skills. These are the kind of conditions of accelerated learning. In other words, this is what we want our swimmers to come to the practice with. The attitudes, the abilities and if they've got those, they'll be able to make most effective use out of the sets, practices and formats that we give them.

Our first is what I call emotional priming. If kids are coming to practice, with the right attitudes, lessons get learned better and they get learned deeper. Namely, if they have a sense of choice of ownership of what they're doing, if what they're doing is emotion laden, L-A-D-E-N, and if the learner is truly engaged. So, basically you kind of boil all those things down and you've got to get a kid thinking, "This is important to me. This really matters. What I'm doing right this second really, really matters." If you get somebody thinking like that, you're 90% of the way towards getting changes made.

Next is focus. Because if a swimmer is thinking about what's for dinner, what to wear to the prom or the fact that their boyfriend seemed a little distant during school or whatever, then they're not focused on whatever skills you're asking them to work on and they're not going to be learning anything.

Kids need to be able to focus. When they swim, especially because we're suspended in water, their bodies and the pool they're in, and their surroundings, the environment is sending them thousands and thousands of messages continually about what's working and what's not. How one thing is different from another. And if they're not paying attention to that, "if the cellphone is off", it doesn't matter how many and how important that information or those messages or information are. Nothing is getting through.

And it's especially hard with certain age groups. Teenage girls, they just love to chat and when you ask them to maybe, perhaps, stop talking and think about what they're doing, it is like, "Well, this isn't any fun," and well then, you have to have all philosophical discussion about the different meanings of fun and situations and all that. So, it's difficult, I understand that. And 10 and under boys or 12 and under boys, they're always grabbing, splashing each other and spitting on each other and all the rest of that stuff.

So, again, it's hard. But getting kids to remember and you convincing them that this is important. This is really going to help you, but you've got to stay focused. That is absolutely key. Just some really

simple ways to get their attention. First is how you structure sets. I'm going to talk about that in a few minutes. Also, the use of random practice and variable practice. The basic point of both of those is variation, variation, variation. So you're never asking them to think about one thing or focus on one thing for a very long time. You're always changing it, okay? And second of all, guided attention. They're getting a lot of messages being sent to them and you need to let them know which ones to listen to and which ones are going to help them, which ones are most important.

Increase their motivation. Again, convince them that this is in their best interest and it will help them meet their goals and all of that. One thing that we've tried recently is just after giving kids the instructions and the goal of a set or the instructions for a set, I ask them to come up with three things that they want to be better at when they finish a set. So it gets them thinking about, "Okay, well, this is what we're doing, how can this help me?" They have to do a little bit of discovery trying to figure out, "Well, why are we doing this? Why are we spending 20 minutes on this set?" It really gives them a sense of ownership. It helps, you know, gets the hook in the mouth and you can start reeling them in. So it's really, really important.

Lastly on focus. I try very hard and often to have kids practice what I call the optimal learning triad. Sounds kind of highfalutin but what it really means is before a swimmer pushes off, they plan. They think about, "What is my intention here? What am I trying to do?" They've got this model for the way a skill is performed, for example. Second, they swim it, perform. Then after that, the third step is comparing. You've got your model. You've got your performance. Now let's put the two together and see how they did, okay?

If you can get kids thinking for even 10 seconds before they push off about, "What am I trying to accomplish here? What do I want to feel like?" Then, have them swim with attention to that model, and then afterwards, think for even 10 seconds about how did I do? What do I need to tweak on the next one so I'm just a little bit closer to my model than I was on that last one. So, getting their heads in the game, getting them really focused I think is absolutely key.

First was emotional priming, second was focus, now feel. This is a huge topic. Everyone talks about – coaches always talk about this, the mystical, magical FEEL for the water that Natalie Coughlin obviously has, Michael Phelps obviously has, and the Olympians obviously have, but that most kids just don't. We pay a lot of lip service to helping kids develop a feel for the water and all of that, but I think it's absolutely important. If you don't know what you're doing when you swim and if you can't feel the difference between two different ways of performing a skill, you have no way to change, no way to improve. So, it may be mystical and magical, but we need to be doing every possible thing we can to help kids develop a sense of this feel, to become more sensitive to what they're doing in the water.

A little bit of a digression on feedback, but it isn't really a digression; feedback is really important. It's the information that's being fed to a swimmer after, usually after, sometimes during a performance. They swim a repeat, they get information about how they did. The usual distinction is between extrinsic feedback from the outside. This usually that means coaches or the environment like a stopwatch or a pace clock. Sometimes it's from watching a film. Usually, it is coach provided.

Then there's also intrinsic feedback and that's the sensory information that they're getting as their bodies swim in the water. Usually the coaches role is to watch a swimmer swimming terrible and then to step in and fix the problem. "Your right arm is terrible, do this instead of that." You come in on your white horse, save the day. Kid thinks that you're great because you fixed his stroke. You think you're

great because you fixed his stroke. Mom thinks you're great because you're actively helping the swimmer fix his stroke. Everybody is happy. That's the usual way things are done.

A different way that coaches can coach with completely different assumptions underlying it, is to just ask a lot of questions. If I see a swimmer's right arm is very goofy, I'll say, "Hey, what is your right arm doing at a certain time of the stroke?" Or, "You know, do you feel the same thing on your left arm that you do on your right?" Just start asking them a lot of questions to kind of guide their attention to a problem. I'm almost never going to tell them what the answer is. I'm not going to tell them that they have a problem. I'm going to ask them enough questions so that they can go in that direction by themselves. When they figure it out, they say, "Oh, my gosh, my left arm is totally goofy when I kick." And then, I'll just start asking more questions. So again, guide them toward figuring things out for themselves. They need to become aware of a problem, then they need to diagnose what's causing this, and then. They need to figure out how to fix it.

If we can get kids doing that on a very small scale, just by asking them questions, soon, they learn to do it for themselves. And you always hear when they talk with great coaches who have coached Olympic champions or whatever, how the swimmer will basically say, "Hey, what's wrong with my left arm, am I doing something weird?" And the coach will say, "Hey, yeah, it kind of looks like you are." And say, "Well, would you watch this?" And they swim it perfectly, "Oh, you're fixed." I mean the super swimmers know how to spot, diagnose, fix problems quickly, intuitively, and practically. We need to teach those skills and ask enough questions so that kids learn those skills. Not just the superstars who probably are going to get pretty darn good even without us, but also of the kids who, if they just get taught some of these skills, they could be really, really good. So, asking tons of questions.

Of course, a problem with asking lots of questions is that it's a struggle for the athlete. You're not just telling them the answer and fixing the problem for him, you're making him do all the work. That isn't always appreciated. That usually isn't appreciated. Twice this summer, like no clue – no lie, I got accused by two of my senior swimmers, "Well, you never help me with my strokes." And after, they kind of revived me from my faint on the floor. I tried to explain to these kids how I was giving them the greatest gift of all. I wasn't solving their problems for them. I was teaching them how to solve their problems, because I'm not going to be standing right over them fixing them 24/7. And even if I did, I know that as soon as I try to do that, they're going to stop thinking for themselves entirely and just depend on me. They develop a reliance on or a dependence very, very quickly. But also, I want them to be able to go out into the world, go on to the next coach and the next coach after that in college or whatever, and be a self-reliant swimmer who understands his or her body. So, you know, it isn't always appreciated when you do people enormous favors.

Obviously, I prefer asking to telling. I probably ask 10 questions for every one or two statements that I give kids. And then, usually, when I do tell them something, it's more to just guide them in the direction of what information to pay attention to. So it's all about getting them to think. Yes, question?

[Audience Member]: "I have heard you talking about asking questions. I'm wondering if in terms of talking to the athletes at practice? Or are you talking about just asking questions at practice and then coaching at competition they take that context from practices to nationals?"

[Michael Brooks]: The question I assume I need to repeat this. The question is essentially "Am I getting kids to think too much?" "Is that about it?"

[Audience Member]: “Do you find that issue at competitions?”

[Michael Brooks]: The way that I coach definitely requires swimmers to think about what they’re doing. I think it develops a sensitivity, discrimination between subtle differences and the way they swim. I think it makes them a lot smarter. It’s my job to make sure that by the time we get to a meet, the skills are down pat so that they are not having to think very much about how they race. The skills are in there. And, if I do have time to talk about periodization of technical work... Well, I’ll give you a snippet because I probably won’t have time. The last six or seven weeks before the championship meet, we’re not trying to make any real changes. We’re just trying to bulletproof the changes that we’ve made all the way up to there, so that those skills will withstand any stress, and kids have the confidence in them that they can go to a national championships and race on this new stroke. Also, that they can do it without thinking, without having to go through a checklist of 27 skills to the perfect stroke. They know how to do this. Hope that answers your question.

[Audience Member]: “In reference to athletes who overthink, do you have skills to help them not to?”

[Michael Brooks]: Right.

[Audience Member]: Is there a certain tool helping them not think, ultimately not overthink? How do you get them to kind of relax?”

[Michael Brooks]: Right. The question is how do you get kids not to think too much, to over think, when you’re working with a group; because some kids are going to get skills very quickly, some are going to get them much slower. Kids work differently and they have different abilities.

I think that to a large extent, what I’m trying to get them to do, is to get them to connect the dots. To realize how different parts of their body are relating to each other and it might be explicit at first, but it becomes very intuitive as kids learn these skills. So, the really good swimmers, they get it. When they’re doing something wrong or ineffective, when their strokes starts to fall apart, they can feel that. They don’t have to explain it. They can feel that and they also can take the next step of making whatever changes are necessary so that they maintain a high elbow as opposed to dropping or whatever the problem might be.

So, I do believe in teaching kids to be intuitive, and getting them to pay attention to feel, without giving them a lot of verbal instructions with lots of, you know, ace of one and two, three, you know, all that. It’s just asking them questions, asking them to feel how different parts of their body are working or not working together. I haven’t had that problem, so I’m going to assume for purposes of answering your question that if you coach like this, you do an end around that problem. I think that is the case.

[Audience Member]: “Do your swimmers become dependent on your questions?”

[Michael Brooks]: The way that I coach hasn’t seemed to cause that problem. The kids have learned how to diagnose, how to fix. It all tends to be varied by feel; that they work by feel. They don’t work by sets of instructions. I definitely think it’s the case that showing is better than telling, and that I can show them a video clip of a model stroke. I can say a few words guiding their attention, but by and large, watching for 10 seconds is going to be worth my explaining a whole long set of skills for 20 minutes. It’s much more effective to watch than it is to listen.

Alright, I had a little bit of a digression on feedback. I think it’s absolutely important that we always steer the swimmers down or back to intrinsic feedback. The information that their bodies are giving them, sensory information is absolutely key. Another digression that isn’t really a digression, is on the use of equipment. Error detection is key to learning. You have a model. You perform trying to imitate

this model, and then you’re able to feel the differences. You’re able to detect your own errors. Often, swimmers are completely oblivious to their stroke problems. I mentioned why earlier. It’s because they perform millions of lousy strokes and that’s the norm. That’s what’s comfortable to them.

Further, because swimming strokes use the whole body---a lot of times if a swimmer has a problem, mistake, or flaw in one part of their stroke, another part of their body is hiding it by having a compensatory problem. So, two or even three different strokes kind of work off against each other. The kids don’t even realize they have a problem and it’s making them a lot slower.

A very, very simple example on backstroke, if you have a swimmer who enters right here for instance and they push sideways, what’s that doing to their hips and their legs? They’re just going all over the place. However, if they’re kicking madly at the same time, their kick is going to compensate for that problem and essentially hide the problem from the swimmer. There is so much information that’s going in there. One part of the body is compensating, or accommodating another, that they don’t even know they’ve got a problem.

We’ll, if you take that same swimmer and put a pull buoy between his ankles, and he pushes like this, goodness graces, his hips hit one lane line and his feet hit the other! And, it is really clear that something strange is going on here. And you ask him at the end of a 50 or a 100 of ankle buoy backstroke, “Hey how is that?” Say, “Is something strange going on with your legs?” And they’ll tell you, “It was just crazy, they’re going all over the place.” Say, “Well, okay, awareness.” Ding, check one box. “Okay. Well, what’s going on? Do another hundred or two and tell me why this is happening because, remember, this isn’t happening to you, it’s happening because of something that you are doing. You are causing this. So, swim a couple of hundred and give me your report.” So they’ll do a couple of hundred and they’ll say, “Well, whenever I push this way, my legs seem to go sideways.”

And then, I’ll ask the next obvious question, “Well, that makes sense, right? Because when you do that, you know, you’re suspended in the liquid, so doing this first line over dive and all the rest of that fun stuff. So, every time you go off line, you’re going to throw the rest of your body off line.” Say, “Okay, we’ve made some steps and discovery here. It’s like Columbus. It’s cool.”

The next step, “Okay, well, we obviously don’t want this, right? Of course not, I want you to swim some more and I want you to tweak, make whatever adjustments you have to make so that your legs aren’t swaying but rather your body is in a nice line.” And it might take six or eight or 10, for some kids, a 100; but usually six or eight, or 10/50’s before they look like they’ve actually made a really nice adjustment to their stroke. Not because I talked to them about how they shouldn’t push sideways, but because they have discovered the true effect of that problem which was being hid from them, because swimming is so complicated. And, if you can, use equipment as a way to simplify the stroke and to clarify the information that they’re being given, because they’re getting a lot, and for the most part, it’s just noise. What we’re trying to help them do is clarify the signal through the noise.

If we can do this in a way that maintains the normal rhythm of the stroke, as I think ankle buoy does for both back and free, we’re not departing too far from the normal full stroke swimming. It’s much easier for swimmers to take the problem and solution that they just found, and then translate that to swimming better, improved stroke skills with a full stroke. Yes.

[Audience Member]: “Are you doing this at regular speed, a slow speed or at their own speed?”

[Michael Brooks]: The question is, are we doing this at super slow

speed, moderate speed, fast speed? Usually, when we're playing with guided discovery, it's at a moderate speed. Just because the faster you go, the less precise anything is, and the less precise those signals that the information is. But obviously, we want to transition to swimming well, fast, but that's several steps down the line.

So, equipment can be a very valuable tool for error detection and fixing problems, correction. But, you have to avoid reliance or dependence on that piece of equipment, and that happens really fast too. So, if we were doing the example I just gave you, when they figure it out and have made those adjustments, tweaks immediately, I'll have them alternate between ankle buoy and regular, so that they can start to translate that discovery into the context of the full stroke, which is what we really want. So, it's not letting them use a piece of equipment to the point that the lessons don't transfer or translate to full stroke swimming. Do you have a question?

[Audience Member]: "Do you tell them why the equipment would be limiting? Do you help them in that process, or not? Do you tell them the equipment can do this, but it's also up to you, so that it's ownership on their part? Do they understand the equipment so much when you're helping them?"

[Michael Brooks]: The question is, "How much of my explaining the rationale behind using equipment?" Probably, right now, not much. I've got an entirely new group of kids and it feels sometimes, since I've only been there a little more than a week, that I'm speaking Greek to them. So, I'm having to slow down a lot more than I would have had to with my York kids, because they were totally comfortable with me and understand my thought process. Right now, I haven't explained too much, just kind of keeping it simple. But, for the most part, when we use equipment, it's not for building strength or anything like that. It's for error detection and technique skill work, not exclusively, but primarily.

A few kinds of equipment we use--I mentioned ankle buoy. We use tennis balls or fists. Either way, as long as they have tiny fists and not cheating. So, I think that's great. We'll use parachutes a lot, but again, mostly for technical work and not so much for power, speed work et cetera. We'll do some of that, but it's primarily for technical work. Paddles once in a while, but almost always with backstroke. Usually just to point to entries and catches, because when they enter with a paddle vertical, the resistance is zero. When they square up and rotate the elbow, the resistant should be infinite. So, they go from zero to infinite, and it's easier to feel that huge difference when they have paddles, compared with just hands.

So, whenever we use equipment, it's very thought through first, because I do believe that the more that you digress from full stroke, free swimming, and here free swimming is defined as swimming with no equipment; The better reason that you need for that digression. So, if we're going to use equipment, the same argument holds for the drills, we have to have a very good reason because there are always unintended consequences, negative consequences, of what we give kids. We need to be thinking through those so that we're truly helping kids get faster, and not just helping them get better at using ankle buoy, freestyle or whatever.

A few different kinds of feel sets that we will do and I think this is really important. We'll film kids, and with as quick a turnaround as possible, they swim and then they watch what they are doing. That is to align what their actually doing, with what they THINK they are doing. With a lot of kids, those two things are really far apart. When you tell a kid you want them to do X, you watch them, they are doing Y. They come back and they say, "Well, I did X." Say, "No, no, no, no." So, they don't really know that they're not doing it correctly. Filming, having that instant feedback, can be really, really helpful. But again, you don't want to rely on it. The point there is to teach them to connect the dots. So, filming can be really, really good.

Eyes closed swimming. Obviously, you have to be pretty careful about kids swimming with their eyes closed, just like if they were driving with their eyes closed. We try and set parameters so that there are not going to be any major traffic problems. But, if you close your eyes for five or six strokes, and then open them just to make sure you are where you thought you were, and still going in a straight line, and then, eyes back closed. It can really, really help because for the same reason that blind people are much more sensitive to feel and sound than we are. Most of the time, the eyes and all of the sensations coming in to the visual cortex are kind of monopolizing a lot of your brain power. If you shut that off, you give these other senses a chance to really work to their optimal. It really helps kids feel what they're doing and it makes so much more sensitivity. But again, you have to be careful or you've got problems.

Random and variable practice. I mentioned this already and I'm going to talk about it more in a few minutes. We do a lot of that where they're varying how they swim, what skill they're focusing on, what piece of equipment they're using, so that they're never getting the same sensory feedback or information twice in a row. They have to stay on their toes.

So we do a lot of random and variable practice. We do a lot of alternating with and without equipment, again, to feel changes every single repeat, so that they're being guided toward paying attention to those differences. There are a whole of bunch of others, but just a couple. One is called a contrast exercise. Say, a swimmer is swimming with a certain problem or certain fault on freestyle, say they're dropping their elbow, simple stuff. We are trying to get them to swim with a nice high elbow catch and pull.

Well, as soon as they have kind of figured out that idea and can perform a high elbow pull, we'll have them do contrast exercises where, for instance, they'll assume a 25 the old way and then a 25 the new way, really focusing on how those two things are different. Okay? So a contrast drill, it's old versus new, bad versus good, feeling the differences between them. And, in theory, as kids solidify, stabilize and start training on those better skills, as soon as they start to fall back into the old patterns, they're going to be able to feel the difference. And so, being able to discriminate between two different ways of swimming the same skill is absolutely crucial. I think contrast exercises can really help kids do that. Yes.

[Audience Member]: "Would you compare a contrast drill to an exaggeration drill? If you take the dropped elbow, and ask them to exaggerate, and then you'll have to fix it, would that also be effective?"

[Michael Brooks]: Would it also work to exaggerate a problem and then do it correctly, exaggerate, do it correctly? Well, have you got it working?

[Audience Member]: "Sometimes."

[Michael Brooks]: Well, then, sometimes it works, okay? I think it's really important that you understand what my function is or I understand my function to be here is to throw out ideas, and then, for you to play and experiment. Because what I'm doing in practice right now is different from what we were doing six months ago, and VERY different from what we were doing a year ago. I'm taking an idea, trying to figure out an interesting set that would help elaborate on that idea, or unpack it. Then, paying attention to how it works or doesn't, and trying to make it better. So, if it works, go for it. Always, however, pay attention to unintended consequences which usually are lurking in the background somewhere. So, you need to pay attention. Yes.

[Audience Member]: "Somebody has given the example of recovery as they're rotating their hip late or early or whatever and dropping the elbow and we find that a lot of times, they'll come inside the line."

[Michael Brooks]: Right.

[Audience Member]: "I'll say to them, I think, it is on the timing of the rotation and when they're pushing their hands. It's like experience. But, I'll say when you enter the hand, I want you to go outside the shoulder line, and they think when you tell them that— when they hear that, they think when they try to do what they think is right, that they're doing that, they're actually going inside the shoulder."

[Michael Brooks]: Right.

[Audience Member]: "What message I gave then outside the shoulder was basically was in line. Do you know what I'm saying?"

[Michael Brooks]: I do. Okay. So, the question/statement is, sometimes, by asking kids to exaggerate what you want.

[Audience Member]: "Like all overcorrect."

[Michael Brooks]: Right, overcorrect, exactly. They'll actually be doing it correctly. And, I think this goes back to what I said earlier about how so few kids know what they're doing when they swim.

[Audience Member]: "But, you're saying too, that there could be consequences to that?"

[Michael Brooks]: If it's working right now, it's working. As long as it stays working, you're probably good. But, as soon as you start seeing a problem, then you need to reel it in. That's what I'm always doing. I give kids a set, or ask them, to do something based on my understanding that this is going to help them be better. And, as long as they keep getting better, we're good. But, if I start seeing negative consequences, I'll stop it right away, try and figure out what's really going on here, what did I miss? Is this just poor execution of a good idea, or a truly bad idea, and take the next step of, "Okay, well, what's next?"

I'm going to go for a couple more minutes even though I'm right on the edge.

Degrees of freedom set. I think this is really kind of fun. We are so fortunate that we have joints. You know, thank God for the human body, because I love rowing. And, if my body were a rowing or a sculling shell, I'm going to swim, I'm going to row, I'm going to paddle, I'm going to move like this. Put my hands in here, my paddles, my sculls, and here, the spoons, and I'm going to push hard. I'm going to be pushing mostly out. And then, for about a 30 degree sweep, I'm going to be pushing almost directly backwards. Oh, wonderfully efficient and really powerful if you've seen those rowers. And, then, after that, most of the pressure is pushing in toward the shell, very ineffective, inefficient.

So for only 30 or 40 degrees of that sweep, am I pushing in ways that I really want to be pushing? That's because I don't have any joints. Well, we are so fortunate in that we've got wrists, elbows. A paddle does have shoulders essentially, but we've got these three joints which help us be exponentially more effective than a rower. Because, by manipulating the degree of bend of my wrist and changing that as I do a stroke, by manipulating the degree of bend of my elbow, manipulating the internal, external rotation of my shoulder, I can put effective pressure almost the entire stroke. It's wonderful being human.

But, most kids don't think about this. Don't take advantage of the different options that they have available to them. They just swim the way they always swim. By doing what we call a "Degrees of Freedom Set", we'll ask them to manipulate all these bends as they swim, and do things differently from what they are used to, and just pay attention to the results. It's fascinating what kids will learn by just letting them go play swimming. You know, just tell them what you want, to what constraints you want them to manipulate and, then, let them find out really interesting things about how their bodies work in the water.

I've used up my first hour, so we'll call it a day for that. I want to start in about six minutes, so take a really quick break.

## The Theory of Motor Learning - Part 2

*Presented by Michael Brooks, North Carolina Aquatic Club*

[Introduction by Kathleen Prindle]

Most of you have been in here, but if you are new to the room, you are listening to Part 2 of the talk by the great coach, Michael Brooks.

[Brooks begins]

Alright, I spent the first whole hour and it really kind of flew by at least to me. It's kind of setting the stage. I want to talk now, fairly sensibly, about the motor learning principles and prescriptions that guide what we do in practice every day and how we try to make the changes, and make them stick.

I mentioned earlier that motor learning is the science of learning movement skills---how we learn best. It's important to note at the beginning of this, that the kind of set, the format of the set that will result in optimal learning is very different from the format of the set that will result in optimal improvements in physiology. These are two different animals. So, I think it's very important when you're trying to write a practice, and the sets that will comprise that practice, that you understand what your aim is with each part of the practice, because you're going to get certain results, certain adaptations and those depend on the kind of sets that you're giving swimmers.

Here, of course, I will be focused primarily on formats that will result in optimal learning. Physiology is another talk. So, the basic format of this section, I'll talk about the motor learning principle. I'll talk about how it applies in swimming. Then, a sample format, or a couple of different kinds of sets that we would use to take advantage of this principle.

The first is modeling. I've talked about this already, so I won't dwell on it. But it's giving kids a standard of comparison, a standard of reference or to compare with, when they perform the skills. If I can get the screen to show us what we want, I will show you what I mean by my model.

For each stroke, I came up with what I call the stroke catechism. I'm Catholic, so a lot of the terminology I use is theological. The kids deal with it, you can deal with it. Stroke catechism. For each stroke, it's a list of approximately six to 10 skills that I consider fundamental to an effective stroke. Each of these skills is illustrated by a video clip.

So, for instance, this is one of the videos that we use. This is to illustrate the high elbow catch. The words we use are wrist, rotate, press. So, wrist cocked, elbow rotated, press straight back. Each of these skills, each of these fundamental skills has a little cue and we use the same words every single time. It's short, sweet, to the point, has to be replicated. Swimmers don't individualize it and make it their own. They use the same words every time.

Another example. This is metronome six-beat. The idea here is I want to see a six-beat kick. It's essentially straight up and down. It's a metronome, regular beat. I don't want strong, weak, strong, weak. I don't want a broken rhythm, stops, or pauses, I want an absolutely regular six-beat kick. Because every single time there is a break in the rhythm of the legs, there is a problem some other place in the stroke, whether it is the head position on breathing or whatever. So, problems are always connected. But, for each of the eight or ten or whatever it is for that particular stroke, we'll have key words for a skill. And, by and large, we will work on these skills in the context of full stroke.

I'll talk in a few minutes about drills and what I think of them. Some of you already know and the rest of you will be scandalized, but, just as a basic idea, almost all of the technical work that we do, and we do a lot, is with the kids swimming full stroke focused on

one skill at a time. The skills that we are focusing on are drawn from the stroke catechism. We use the same vocabulary every time to describe a particular skill. It's really simple and I think very effective. Yes, question?

[Audience Member]: "How can we sign up for a stroke catechism class?"

[Michael Brooks]: Well, the question is, how do you sign up for stroke catechism class. I came to the stroke catechism and it changes a little bit from year to year, as I decide one thing is little more important than another, where I change the way that I describe a skill. But, I came to it by watching hours and hours and hours of elite swimmers video, primarily underwater video, and trying to figure out what the best people in the world were doing. No two of them had exactly the same stroke. The rhythms look different. Michael Phelps doesn't look like Tyler McGill or like Chad le Clos on butterfly. They are different. But, they share about 99% of their technical DNA and there are a lot of commonalities.

So, boiling down all the individual differences, it came to a list of what I consider the most important skills. You know, probably no two coaches are going to agree entirely on what they think is important, on what model they have of the stroke. It's probably not that important that we do agree, entirely, at least. But what is important is that you, not me, but you have thought about it, and done the legwork to figure out, "I want my kids to swim like this."

So, I came to it by watching a lot of video and I change my ideas every now and then. Somebody does something new. It seems to me to work according to laws of physics and hydrodynamics and whatever. I don't feel like I have to defend whatever version of the catechism was in the book because I retain the right to get better and to learn. So, I'm not going to stake my reputation on what I had in a book a few years ago. So, this way I get to write second edition and I can make oodles more cash in royalties.

[Audience Member]: "There you go."

[Michael Brooks]: So, we've got the stroke catechism and we've got the video catechism, which is a set of clips that illustrate those important skills. Now, super fun stuff, random practice.

Usually, random practice is compared with what we call blocked practice. Examples, blocked practice would be 20x25s catch-up on 30 seconds. I am giving the kids two or three things to focus on. They swim the whole set doing exactly the same thing, thinking about exactly the same thing. That's blocked practice. You're doing a whole bunch of things and it's very uniform.

Random practice would be 20x25s on 30 seconds, where each repeat, we focus on a different skill, from the stroke catechism so that with every single repeat, a swimmer has to think, "Okay, reset. Now, I want to focus on metronome six-beat. I have this idea in my head. I swim, trying to swim according to that model. I finished. I compared A and B. Okay, what's next? High elbow focus or finger-drag recovery? Okay, reset. Now, I want to do this. I swim. I try and swim according to the model. I finish. I compare. Okay, reset. What's next?"

So, every single repeat or very close to that, they're changing the intention. They're changing the attention, they're changing the sensory information that they're paying attention to. They are learning. With the blocked practice format, after the first two or three repeats, there's not a lot of learning going on. Brain is on autopilot and the analogy I like to use is like from math, super simple. Question number one, what's five times three? Fifteen. Excellent. Good job. Question number two, what's five times three? Fifteen. Question number three, what's five times three? Fifteen. Question number four -- what's five times three? Okay. Ad nauseam.

The first time, I had to think a little bit if in I'm second grade, but

after that, maybe after the second one, there was zero thinking going on whatsoever. But, if I'm changing it up every time, five times three, 13 times seven, 48 times 17, you know, whatever, every single repeat or every single question, I'm having to start from zero again, kind of reboot and then attack the problem. Question.

[Audience Member]: I appreciate that you allow for an exchange, however an eight year old is going to be at a different level than a fifteen year old. Does the set vary according to the swimmers level?

[Michael Brooks]: The question is, does the kind of set we give kids vary according to the age and developmental level of the swimmer?

[Audience Member]: "How many things do they have to think about?"

[Michael Brooks]: A number of things they have to think about. Well, in reality, I'm only asking them to think about one thing at a time. I'm just changing after every single repeat. Did that make sense?

[Audience Member]: [Indiscernible]

[Michael Brooks]: So for, but it is the case that with an eight-year-old or a brand spanking new swimmer, I probably won't do full-scale random practice. I would do more blocked. I might do four repeats in a row with one focus, because all these skills are so new, it's going to take them three or four or five repeats to just get a general idea of the skill that we're talking about.

[Audience Member]: [Indiscernible]

[Michael Brooks]: The question is, do I have in my head kind of an idea of what sort of practice is going to work best with different ages? Yes, I got a lot of stuff crammed up in here, a lot. And, I've been doing this long enough so that I do have an idea. I can look at a swimmer and see how they respond, and that's what I'm really gaging after. For instance, with my new group right now, and they're senior level swimmers, I can't do the kind of random practice that I could do with my York kids, because for these kids, everything is new. The vocabulary I'm using is different, the particular skills are different, so I'm having to treat them like I would have with my 10-year-olds in York.

So, yes, it does depend on the level, the experience of a swimmer and the group, the swimmers in a group. You pay a lot of attention to your swimmers and how they respond. But the idea is you want to keep them on the edge. As soon as they really get the skill, you change it, so that they are having to struggle again, or at least, to reset their onboard computer and attack another problem. Yes?

[Audience Member]: [Indiscernible]

[Michael Brooks]: Well, it's really interesting because right now in Chapel Hill, I'm not only working with a lot of swimmers to whom this is completely new, I'm dealing with a coach and staff to whom this is completely new. I'm cutting them a lot of slack, because what I can do without thinking about it, because I've been working on these ideas for a long time and trying to implement them for a long time, they can't do. So, it takes them longer. The tempo of practices isn't nearly as quick. So, it's hard at first. It seems really complicated at first. To me, it's not complicated at all anymore because I have the framework in my head, and I can just put in different parts and keep it all organized. But, that has only come with a lot of practice.

The beginning of the season when you have a slower pace for practice anyway, is a really good time not only to introduce this to swimmers but to get it introduced to a coach, because practices will go a little slower, really working on skill work. Physiology isn't quite as important. So you have time to make your mistakes and learn how to do it. But, it took a long time. Where I am right now is a level of sophistication that is well beyond what I had a few years ago, just because I've been working on these by tweaking and polishing these

ideas every single day.

[Audience Member]: [Indiscernible]

[Michael Brooks]: The question is, they are doing a lot of different things but where are they getting the repetition, the 10,000 hours of deliberate practice or whatever you want to call it if you want to go that direction, which I don't, but I will for the moment. In motor learning circles, they talk about repetition without repetition. That you want to get a lot of reps of something, say freestyle, but you want to do that with as little back-to-back repetition as you can.

So when you think about it, if you're doing a Michael Brooks random practice set, they're doing 20x25s freestyle, but they're focused on something different every time. They're resetting the computer every time. When they do that, they are giving those different skills, those, say, ten skills in the catechism, a chance to work together and fit together which they would not get if they just did 20 of them focused on one single thing. So, it's repetition without repetition. The learning rates are drastically accelerated, compared with your typical blocked practice. Kids have to think every single repeat. They have to compare their performance with the model every single repeat, so they are learning a lot.

Now, one of the ways that we put this into practice is really simple ideas called rainbow focus, pass it on. We're doing our 20x25s on 30 seconds. I tell the kids one time that, "Okay, on repeat number one, the focus is metronome six-beat. Let's say we're doing 50 s because that's easier. I don't have to keep walking back and forth. But, say we're doing 20x50s, okay. First, swim metronome six-beat. They swim. When the first group, the leaders in each lane get to the wall, I'll announce the second skill. Finger-drag recovery. I say it one time. First person passes it to the second, second to the third, third to the fourth, all the way done the line, okay? They have to say it loud enough so I can hear it every time.

It's like a chorus. I say it one time. We don't have to wait for the last person in the lane to finish, and then, for me to give a speech. So, we can get a lot of learning done, a lot of repetition without repetition, a lot of deliberate practice, thoughtful planned practice in a short amount of time. It looks like a normal set. But the rate of learning is accelerated because they're swimming. They're not standing around waiting for me to talk to them for a lot of time. There's very little downtime. Further, they have to take responsibility for listening to the message from the kid in front of them, passing it on to the person behind them. So, that helps reinforce that particular skill in their heads every single time.

It really works, and it works with the 10 and unders. John Nelson, my old assistant, now the Head Coach at York, had been working with our 10 and unders the last couple of years and they are really good! Kids can do amazing things if you give them a chance to prove it. They can pay attention, they can do the stuff, and it really, really helps. Question over here?

[Audience Member]: [Indiscernible] "I have them say thank you just to make sure that they received it."

[Michael Brooks]: Okay. The statement was, she's been working with rainbow focus for three years and, not only does a swimmer acknowledge the message but thanks the person who gave it to them, for passing it along. And I assume that also makes a much polite swimmers. So, thank you.

That thing about social media is totally true! My wife will text her daughter, my stepdaughter, who's one room away. I thought it was only teenagers who did that, but it isn't. So, yes, it's nice to actually talk to each other and pass along important information. Was there a question over here? Yes?

[Audience Member]: "So when you are doing the random practices and you're working on skills but you see that that the skills are not

being demonstrated the way you like, how do you handle that? Do you have them repeat, or they just move on?"

[Michael Brooks]: The question is, what do I do if they don't look the way I want them to look? I'll usually make sure that I cycle that skill back in again relatively quickly. I won't go through a whole cycle, just to see if it was maybe an aberration. If I notice that it's still a problem, I might put that on the backburner until they do a few more. Then, I might stop the whole group and kind of reinforce. And, remember, finger-drag recovery means you're not swinging your arm out, you're picking the elbow up, just sliding it along, straight forward, setting it in nice and pretty.

So, I would probably, after a little bit, stop them briefly, unpack the skill a little bit just to make sure they all understand what I want to see, and then send them off again. But I try and make sure that any speeches from me are very short, very pointed. So, we are not spending a lot of time on the wall. They are getting as much learning as is humanly possible in any practice. So, I keep it very, very short.

Now, a variation on this rainbow focus pass it on is, what we call HRPK. Sounds, and it will sound, when I elaborate on it kind of complicated, but not really. HRPK means H: head, R: recovery, P: pull, K: kick. So, we've taken four fundamentals of how the body swims. And in freestyle, for instance, our H focus would be head steady, one goggle breathing. The R would be finger-drag recovery. The P would be wrist, rotate, press. The K would metronome six-beat.

So, if we're doing any repeat that's divisible by four, say hundreds divisible by 25s, or a set where the total number of repeats is divisible by four. It doesn't really matter how you do it. I would just have kids focus serially on first H, then R, then P, then K, so that I don't have to spend my whole time at the end of the pool telling them what I want them to focus on. They've got the main points of the stroke that they're going to be focused on, one at a time. It keeps their attention much better. I know because the order is the same every time what I'm supposed to be seeing, and I pay fairly close attention to aberrations, especially when they become patterns.

It helps the different parts of the stroke harmonize with each other, because they are working one at a time. It's a very simple way of allowing kids to do essentially random, you might call it serial practice, getting the main stroke focuses repeated over and over and over. It allows me to watch more than I can when we're just doing a rainbow focus pass it on.

You can throw in so many different variations. I mean, you're limited only by your imagination. You start throwing in breathing patterns on freestyle or butterfly, stroke count variations, stroke tempo variations, descending speed variations, and pretty soon, you've got lots of moving parts and kids are really having to be on the ball because they're supposed to be controlling or mastering more than one variable at a time. It's just fun. It really keeps them on their toes. They like it. I mean, they usually say, "Gosh, I have to think so much." That's their way of saying, "That was good coach." Yes?

[Audience Member]: "When you put that together, did you order it specifically or is that just random order?"

[Michael Brooks]: The question is, did I order the HRPK for a reason or is it just randomized? Essentially, it's for a reason because with the H and the R, it's kind of setting the body line. With the P, after you've got a nice straight line, you're going to be able to pull more consistently. I always want kids hard on their legs coming home. So, it didn't start out as HRPK, it was something else. I can't even remember. Then, I started thinking, "You know, it makes a lot more sense if we do it the following way." So, this is probably the third iteration before I found the one I really like.

But, you know, like I said, what I'm trying to do is throw out ideas for

you to play with and presumably come up with better ideas than the ones I'm giving you. And then, it is your obligation to get back to me and tell me how I can get better, because that's part of the deal. Yes?

[Audience Member]: [Indiscernible]

[Michael Brooks]: Okay. The question is, some kids are going to be more visual learners, some are going to be more verbal, just kids have different learning styles or skills, and how do we take that into account when we're giving kids set formats?

I'm going to zip ahead for a moment and, talk about some of the ways we would use a video catechism because, we show a lot of video. It's a huge part of our technical improvement program. We call it video catechism day, or video catechism set, where we would take one of the clips like I showed you. I would have it slowed down, about half speed or one-third speed, so slow motion. Kids would sit in their training group, in front of the very large flat screen television. They would watch, actively watch a particular clip for about three to four minutes, okay? And actively watching means you watch Michael Phelps do metronome six-beat, but you feel yourself do that skill just the way he is. Three minutes or so. Really dial-in. Then shut your eyes for a minute and I want you to feel yourself performing that metronome six-beat. Start at a slow tempo, same tempo you just watched, and I want you to gradually pick up your speed until your swimming race speed performing that skill.

So, watch first, observational learning. Then imagery or visualization. Then we'd pick another skill. Let's just say since we just did legs, we'd switch to the other side of the body, other end of the body, and we do a catch: wrist, rotate, press focus. We do the same format. Three minutes watching, active watching, one minute imagery. Then we'd get in and kids would do for instance, 12x50's on :50 or whatever, alternating the two skills. If kids are relatively good at this, we would have them descend by pairs, so they start very slow and they gradually build in speed. So they're only alternating between two skills, but then, the speed or intensity is changing from start to finish.

It's a way of bringing in that visual learning which I think is absolutely key; being able to see a model and to feel what he's doing or she's doing.

Another variation of that is we would wheel that televisions as close to the end of the pool as is financially possible, and the kids would watch the video clip in between repeats. So they'd finish, they'd watch about 20 seconds, they'd shut their eyes for about 10 seconds and kind of plan, "This is what I want to do." Then they'd swim, trying to mimic or imitate the model. I might do three or four in a row with one single skill and then switch it. The idea is that they watch, they perform, they watch, they perform, so it's very quick back and forth. I think that it's a really simple format and very helpful for solidifying that ability to distinguish between the model and what you're doing. Yes?

[Audience Member]: "Is that like the principle of neuroplasticity?"

[Michael Brooks]: This whole talk is about neuroplasticity. I didn't want to scare anybody by using that. But, yes, we are after rewriting their brains, and that's what neuroplasticity is all about. Yes, Bob?

[Audience Member]: "Would you use any physical movement in the curriculum?"

[Michael Brooks]: Some kids do and you can see them. For instance, when they are shutting their eyes and they're on deck, I see some of them and they're kind of knitting their brows and whatever. Sometimes, I'll have them swim watching a mirror, so they can see themselves. So, yes, there's some movement involved sometimes. Some kids more than others, sometimes, I'll tell them to. So, there's a lot of variety. But, the basic principle on both, the video catechism and the having come up with a cool name for that variation, but basic idea is they're watching, imaging, performing and just trying

to move their stroke closer and closer to that model skill that we've got on video.

So we talked about modeling, we talked about random practice. Very quickly, variable practice. That is distinct from constant practice. Here, examples would be constant practices, race pace training, 20x50's on :45, hold your 500 race speed. Simple. They get a lot of repetition at a certain stroke, certain speed, certain stroke parameters.

Variable practice. The simplest example would be 20x50s on :45, descend one to four, five to eight, et cetera. Where they never do two repeats in a row. In this case, the same speed. They have to make adjustments the whole time.

Now, some ways of descending training are a total waste of time when you get a swimmer whose four repeats in a cycle are 32 flat, 31.9, 31.8, 26.2. That does nothing. However, if the swims are controlled and in a nice progression, then it teaches a lot. Sometimes, just from talking with some friends, you tend to think pacing is just kind of, well, whatever. Distance swimmers do it, and we'll do some descending stuff every now and then. But, you know, what we really care about is number four, number eight, number 12, number 16 and number 20, how close are they to race speed. That's how we really care about.

But, I think pacing skills are fascinating and I think, key to technical mastery. Because we've got all these skills and presumably, we're doing a lot of technical work and learning these skills. Pacing is how we put them together under a range of expectations, demands, and needs. Can we control our stroke? Can we optimize our stroke through this range? That's what pacing really is. Because, if I swim a 50 at 30 seconds, and then I swim a 50 at 28, freestyle, those are two very different freestyles. The tempos are going to be different. The distance per stroke are going to be different. The precise way that I perform each of these skills and how they fit together are different. The physiological demands are different.

These two things are like apples and oranges. And even more, if I swim 30 seconds on a 50 and I'm fresh as a daisy, that's very different from swimming 30 seconds on a 50 if I am dog-tired. The motor unit recruitment of the particular muscle units that are being used, are very different. Usually, the stroke skills are going to be very different as well. It might not be easy for us to see it, kids can probably feel it, but a stroke is not this monolith that's the same at all times. It's different at every single point along this speed curve.

Fairly recently, I was listening to this really old talk by Bill Boomer, and he talks about speed choices or something like that. And, what I was thinking about with pacing, because by then I was already freaking out about these talks, was dovetailing precisely with what he was talking about. Kids are making choices. Often, those aren't explicit choices at all. But we're probably better off if at least initially while they're learning to be, we make those choices as explicit as possible. How does your stroke change as you get faster? Because pacing is, how do you swim at a particular speed efficiently?

If the two of you swim 28 seconds per 50 and you can do it at 140 heart rate and you have to do it at 160, my bet is on Brant. And, you know, everyone has seen at the end of the sets almost always have the kids do 6x25s on 30 side-by-side racer gets out, because we want finishing kicks as good in the pool as the Ethiopians or the Kenyans have on the track. So, no matter how tired they are, no matter how long a set is, we finish with some crazy fast sprints.

Well, if in order to go fast the kid has to take eight more strokes than they've been holding throughout a set, then they're not getting faster intelligently at all. And the kind of stroke that they use, usually one where they're seemingly attempting to beat the snot out of the water, that's a stroke, that's a choice that they're not going to be able to maintain, because physiologically the demands are so high

they can't do it. So, they've got to be able to swim at any particular pace as efficiently as possible, and they've got to be able to get faster intelligently. That takes a lot of practice.

Pacing is so cool when you think about it. There are a whole bunch of different ways that you can work on pacing skills that will help kids optimize their stroke at any point along that speed curve. It will give them technical mastery, and that's what we're after. It's one thing to be able to swim the skills and have them harmonize together. But can they do it in different situations, in different needs, and in particular in racing? So having that control over the different speeds used in racing is absolutely a key, but training speed is important as well.

There are a lot of different kinds of sets that we use with variable practice. I kind of want to jump to the next thing because it's the most controversial. And if we have time or if you buy me a coffee, I'll tell you anything. We can postpone the kinds of variable practice until later.

Next, really important motor learning principle is the primacy of full stroke. If you look at our program, we might do drills at most 5% of our technical work. And the overall program maybe 2%. So, by and large, we are working to improve our swimming skills by swimming the full stroke. Again, not all the time but really close to it. We've been blessed to have had a number of these visitors over the last couple of years, because we've had some kids do fairly well. So, people want to see what we're doing. And it astounds people the way we work on strokes. "Well, where are your drills?" "We keep them in that storeroom and we never open it." So, there are ways to do this that I think work a lot better than drills, and I'm about to tell you why.

Probably most coaches use drills extensively to improve stroke skills from age group, all the way through the pros. Now, you always see "my top 10 favorite drills for freestyle," by some famous coach. That assumes that when you work on this drill and improve on this drill, that you are going to get better on the full stroke. That there is going to be some transfer from this work to this work.

Usually, we assume, or we start from the observation, that these two things share a particular skill and that's going to be our target. So, this drill has this particular skill A, the full stroke has this particular skill A. These two really aren't the same, but they share the same thing. So, if we work on this, this is going to get better.

That is a highly problematical assumption because transfer works best when you're dealing with a brand new beginner learning a skill. And the more that you work on a skill, the better your stroke skills become. The more precise, the more specific you swim. So, it may be the case for an eight and under or a new nine-year-old, 10-year-old. So, for the younger kids having them do, say, catch-up freestyle really does help their regular freestyle. But, once they're older and their stroke skills are relatively good, there's probably almost zero transfer from the one to the other.

Next, I have a wonderful quote by Richard Smith, about transfer and how it lessens as skills develop... but you'll have to trust me that I have it.

So, transfer applies best with beginners, and that lessens as skills improve and become more specific. Further, it's usually the case that coaches will give swimmers a particular drill and they'll do it, but it causes certain problems. So we give them another drill, because this compensates for this problem. But, it causes another problem so we give them another drill because it compensates for that second problem. And we give them another in practically infinite regression.

When you think about it, if you have to have a series and a growing series of drills to solve all the problems that the drills have caused: A.) It takes you a lot of time to go through all those, and. B.) It's

a highly indirect method of getting faster at freestyle. We can get faster at freestyle by working on freestyle and working on one skill at the time. Again, using that stroke catechism as the basis for skill work. But it's very direct, to the point way of improving the skills.

Now, it is the case that with the younger kids, say 10 and unders, we would have them do more drills, because the goal is different. With a 10-year-old, I might not be aiming at explicitly improving, optimizing this little kid's freestyle. Instead, the goal would be to give the swimmer the biggest arsenal of movement skills they can possibly acquire, not only in the water but out of the water as well. Make this 10-year-old kid a master of movement, so that it's easy from that foundation to have him or her improve and work on strokes skills more specifically later on.

So for 10-year-olds, I think the goal is very different. So, the guidelines that I have always used are different from the ones, say the 11 and overs, unless you have a new swimmer. You know, 11 and 12, new to this sport.

Another reason why drills don't work, just to be blunt, and that's for the most part, because there are a couple that I really like. But for the most part, drills don't work because a swimming stroke... again, let's just use freestyle... is a collection. It's a series of skills that all fit together continuously. And how I do one, affects how I do the next one.

Super simple example, if a swimmer breathing lifts the head up and tosses the arm on their recovery, then one time their stroke is starting right here. Then, they don't breathe, it's going to start right here. Sometime it starts two feet underwater, sometimes it starts six inches underwater. They never start a stroke in the same place twice because of what the previous skills or, the poor performance of the previous skills. All of those skills were together. That's one reason with HRPK that we started beginning with body line because I realized that if the body line skills were awful, the pulling skills couldn't be good. So, these parts all fit together, really tightly. They interact strongly. Everyone affects every other one. And given that interaction, it isn't a reasonable assumption to say that these two things, this drill and this full stroke share this skill.

So, if I work on this, I get better at this. Because this skill is embedded in a drill whose wholeness, whose parts... the interconnection of the parts, is completely different from this one. We can't say, "Well, this skill, take it out like a surgeon and transplant it into this." Because motor skills just don't work like that and it's so much easier. So, if I need to fix a recovery to work on freestyle, and have them think about recovery, and I want to have them work on the kicking skills, we do metronome six-beat. Yes?

[Audience Member]: "So, in essence, the drill is basically another stroke?"

[Michael Brooks]: The question is, in essence, the drill is another stroke. Exactly. For new swimmers, beginner swimmers learning a skill, that is probably not true and there is transfer. But, once kids have gotten to reasonable level of confidence, the body sees them as different animals, one's a cat and one's a dog. And even though a cat has ears and a dog has ears, the cat's ears are all working with the cat's parts and needs, and the dog's ears are working with the dog's parts and needs. So, they aren't the same and you can't just take my dog's ear and put it onto my cat and have everything work well. It just doesn't work. Those two things are different. So, that's exactly the point I'm trying to make. Said very succinctly and I'll put that into edition two. So, thank you.

And really, full stroke swimming is the only thing you don't have to make accommodation for. It's a very direct way of getting to the heart of the problems and solving the problems. And I do understand that, you know, for most people, what I just said is heresy because, you know, I learned how to coach from a coach who did

drills all the time. And when I was starting out in coaching, I kind of called myself the “drill king.” And, yes, I am not proud of that. But, I had a whole smorgasbord of drills that I used because I thought that was really, really smart, because that’s what my coach told me to do and that’s what I knew.

And fortunately, my brother steered me to motor learning and I starting to learn. I was just in shock and in horror with each page. “Oh, my God, what have I been doing?” And, you know, one of the challenges is that a lot of the motor learning experiments have been centered on very simple skills because they’re easy to measure, like tapping drills. They’re very simple skills, rotary.

The problem with really using and applying the principles of motor learning has been that, I’m dealing with a full-body movement, very complicated timing among the different parts of the body and the limbs against resistance. So, physiology plays a huge part in swimming. It’s a really complicated thing. One of the newer schools, probably not new anymore, but the newer schools that constraints led ecological psychology, dynamical systems. I mean, they go by different names, but they’ve really started looking at these complicated movements like we do. I’ve been stealing from them as much as possible and trying to figure out how their teachings apply in the water.

Another challenge is that so few people have worked in the water with swimmers because it’s hard. Water goofs things up. It’s hard to get really good on-the-spot video because Wi-Fi doesn’t work underwater. And, when you’re on deck what you most need to be able to see, you can’t see very well. Even when somebody is in the lane closest to you. What’s really going on underwater, you don’t have a clear view of. If they are eight lanes over, no chance, what so ever.

As a coach, you need to get really good at being intuit about what’s going on underwater from what you see on the surface. That’s why I love to watch from the side of the pool, because I can watch momentum. I can see changes in speed. I can try to put together, connect the dots between what I see them doing, and how much forward momentum they get or don’t get. But the reason I have to do that, is because we’re not playing volleyball. I can’t just set up the camera on the edge of the court and be able to see in great detail exactly how a player is performing a skill. It’s so much harder for us. And that difficulty has funneled into the motor learning field. So very few people have really worked on what we need, desperately need, if we want to do our jobs really well.

So I’ve started to kind of amass a little network of motor learning people. Thanks to email. Goodness gracious, you can talk with a Brit in two seconds and it’s wonderful! But, try to get some people who are interested in these questions, thinking about our questions, and how to solve our problems, and not a volleyball player’s or soccer players. Yes?

[Audience Member]: “If you’re into learning motor skills in the full stroke, where do you see the dedicated kick sets and the focus on kicking with strengthening the legs?”

[Michael Brooks]: Great question. If I like full stroke, what do I think about kicking sets? Because, that’s part practice if there ever was any.

Okay. Well, I’m of two minds about it. I know that kicking is very important, but I also know that kicking inside the rhythm of the stroke is what really matters. And, I see it all of the time, kids who are wonderful kicking on a board, as probably most of my current senior group. Put board on them... Boom, they are awesome kickers. Take the board away and say swim, not so great. Because they are being able to integrate a true metronome six-beat kick into the full stroke, the rhythm of the body, the role of the torso, et cetera. Those two things are really different; kicking on the board and kicking

while you’re swimming. This is more important than this.

And, one of the things I’ve done just in the last week, because it took me about four seconds to see this gaping problem, was when we’re working on kicking skills. Right now, we’re alternating. So they might do a 50 with a board and then a 50 regular freestyle focused on metronome six-beat. And, I’ll be asking them questions the whole time. When I see weirdness, I’ll just try to guide their attention to problems that they might have, so that a couple of weeks from now, I will see orthodox six-beat kicks and I’ll have a group of kids who, at least in theory, are ready someday to go off and break a world record, because right now it is not happening. Yes?

[Audience Member]: “How do you feel about equipment?”

[Michael Brooks]: The question is equipment basically. I feel about equipment the same way I feel about drills. My grand principle is the more I digress from full stroke free swimming, the better reason I better have to do that.

So, if I’m going to use a piece of equipment, I need to know why I’m using it and not just for a change of pace, or to give the kids a little break or whatever. I have to know exactly why I’m using it. I have to ensure that I’m not getting reliance or dependence problems so that there’s going to be some alternating between equipment and full stroke drill and full stroke.

I’m going to have to pay very close attention to unintended negative consequences. And as soon as I see them, change what we’re doing. The drill, or the piece of equipment, has to give kids access to important information that they weren’t getting otherwise. So, it’s got to actually bring something to the table and at least, in theory, allow them to improve the full stroke. In the end, that’s what I want. We want to get better at freestyle, we want to get better at backstroke, et cetera. I don’t care how well they do with an ankle buoy. I don’t care how well they do one arm backstroke. I want to make sure that their full strokes are getting better and everything else is a means to that end. As soon as it starts becoming the end in itself, then we’re going off in the wrong direction.

Let’s just take at least a few minutes for questions.

[Audience Member]: “Do these principles work in all four strokes?”

[Michael Brooks]: Yes.

[Audience Member]: “For young swimmers?”

[Michael Brooks]: For young swimmers?

[Audience Member]: “Yes.”

[Michael Brooks]: The question is, do these principles work in all four strokes and even for younger swimmers? For instance, butterfly.

We do more drills. The proportion of technical work would be higher with drills when we’re working with younger swimmers and fly. But even so, we really only have two drills that we do in butterfly. One is what we call a one-arm B, so one-arm butterfly. The arm you don’t use is down by your side, and you breathe forward every other stroke. It’s pretty challenging.

The other is what we call single-double B and that’s single arm, full stroke, single arm, full stroke. You breathe on the full stroke. But, those two drills retain the rhythm of the overall stroke. They simplify it, both in terms of motor learning and the number of moving parts, but also physiologically, so kids can do more of it.

But, I would say even with the 10 and unders, we do try and do full stroke butterfly for technique, or we just might do more interweaving of alternative freestyle and fly, or dolphin kick and fly. This is so that they’re never going to be asked to do more consecutive fly than they can handle well, because I love beautiful things. I love beautiful swimming. And ugly swimming turns my stomach. I can’t handle it at all. I spent a lot of time on deck. I want it to be aesthetically pleasing.

So, we don't do more butterfly. We don't do more of whatever stroke than they can do. So, yes, the same principles apply, but they're tempered a bit to the ability level of the swimmers' strength and the fitness levels as well. Okay, yes?

[Audience Member]: "So you mentioned how you format your sets for technical changes different than how you format the physiological changes."

[Michael Brooks]: Right.

[Audience Member]: "So could you give us insight to the thought process behind your daily planning and simple planning to achieve that balance?"

[Michael Brooks]: The question is, sets for physiological improvement look different from sets for technical improvement and how do I figure out all that – how do I figure it all out. And unfortunately, that's about a 40-minute long answer. It depends on how I structure the season. And, in a very small nutshell, we have about a 4-5 week technical improvement phase where there's a lot of technique work all the time, all the time, all the time. So lots of random practice, lots of varying and all that.

Then we have kind of our ordinary time where we have four-week phases. Each phase is completed by a meet. In particular, by a prelim, final relatively important meet. Where are in this phase, we have one week that's called a Techweek. We've use the data that I've gotten from the previous meet, like what are our most important problems that we need to aim at. So, we have one week where we really aim at those, a bridging week, where the goal is to take that new skill and give it legs; make it a little stronger, make it a little faster. Then, two weeks of just more normal training where in theory at least week and now train on this new skill.

The last six or seven weeks, which consist of a pre-taper and a taper. My kids will tell you that our taper last about two days. This actually is longer than that. But, you know, this last six or seven weeks, the goal is to bulletproof the different technical advancements we've made throughout the first, five, six months, whatever, of the season. Because if kids are not ready to race on those skills, they're not learned and they're of no real value to us when they get on the blocks at nationals. But it's a long answer. Yes?

[Audience Member]: "Do you incorporate underwaters as its own stroke or as part of all the rest?"

[Michael Brooks]: Do we incorporate underwater work as its own thing, a separate animal, or do we work on it with all the rest? A little bit of both. And probably, it depends more on the part of the season. Right now, it gets its own place at the table. As we go, it's just part of maybe not every set, but pretty darn close. So, yes. Yes?

[Audience Member]: [Indiscernible]

[Michael Brooks]: Okay. Once we get in to more of the conditioning focus where the aim is physiological improvement, are we still using this random practice, variable practice, et cetera, et cetera formats? Yes, yes, yes. I think a lot of times, coaches will have the first month, where we want to get better technically, and then the goal for the rest of the season is just to maintain. We can train the snot out of them and hope like crazy that we maintain the strokes, but that doesn't happen. So we're trying to get better all the time. Yes?

[Audience Member]: [Indiscernible]

[Michael Brooks]: The question is, how do you implement this more random practice or rainbow focus when you're dealing with kids with a wide range of ability and wide range of send-offs? Well, one variation to rainbow focus is the leader of each lane determines the stroke focus, which means that no two lanes may be doing the same thing, but the rule still applies. You need to pass it on. This does give them some ownership of what they're doing. Especially, if you're

changing the order of lane so that everybody gets to lead some time. That's a way to take into consideration this difference in abilities and still get the same kind of learning done. So, yes. Yes?

[Audience Member]: [Indiscernible] If you are working with a high school team, and you're not the high school coach --- if they train with someone else in the morning, and with you in the evening will they still be able to retain what you have taught or will they lose it.

[Michael Brooks]: Okay. The question is, if you're dealing with, for instance, high school age swimmers and they are training with somebody else in the morning and with you in the afternoon or vice versa, how do you ensure other than lots of Hail Mary's and Our Fathers that the lesson you're trying to teach them make it through the gauntlet of this other coach or practice and show up the next day? Is that a good translation?

The answer is, if you have communication with the other coach, it really helps if you let them in on some of the mysteries. It helps a lot if you've educated your swimmers that they need to take responsibility for their own technical improvement and not just depend on you or your teammates, or your practices, but it's something that they need to be thinking about and working on all the time, whether they're with you or with somebody else. That helps a lot.

Sleep helps consolidate motor memories, and just as a general thing, if they get enough of it will help a bit at least. But, if swimmers are watching a little bit of the video catechism before they go to bed, you know, just watch five or 10 minutes and really actively watch observational learning that accelerates the consolidation overnight. So I highly recommend that our swimmers do that. It also helps make those new patterns, new connections more stable.

[Audience Member]: Do your swimmers have access to the videos?

[Michael Brooks]: Yes. I make the video catechism the whole series available to the swimmers. I don't force it on them. They have to bring in a flash drive and I give it to them. I tell them how I think they can most effectively use it. Some of them do. Some of them don't. Yes?

[Audience Member]: "You said they think that taper is two days. How long is it actually and then what age?"

[Michael Brooks]: Do I taper the younger ones? No, not really. For senior level swimmers, I'll start planning for the last day before the meet, seven-week. Well, since the beginning of the season but really I'll start setting it up seven weeks up. The actual taper in my eyes is three weeks. But we swim fast all the way. We swim faster and faster as we get in, but for shorter and shorter repeat distances and with greater and greater rest.

So, we go into meets swimming crazy fast. The kids who have tapered best and had the biggest improvements, are the ones who are swimming the fastest going in. Because some kids will self-taper and say, "Well, you know, I'm just going to make myself tired." I think that what they really are doing is not sharpening those motor skills enough.

Unfortunately, we have to call it an afternoon. Thank you very much.

###end###

# What Makes American Swimming **STRONG**

by John Leonard,  
ASCA Executive Director

**The opening question has been debated over the decades of American dominance in international swimming.**



Coaching

A few answers are obvious to those even rudimentarily familiar with American Swimming. The real key is much less obvious.

USA Swimming has dominated the international scene at the **OLYMPIC GAMES** for many many decades now. Only once have we suffered a second place finish, back in the 1950's when Australia ruled at home, since the opening bell of the modern Olympic Games.

Despite an ever strengthening international swimming competition, with more nations than ever getting a podium place, in 2008, 2012 and 2016, the USA dominated to a degree that was shocking to most knowledgeable observers in the sport. After lackluster World Championship performances in the "in-between years", the USA rose up at each Olympic Games and were absolutely dominating to the chagrin of many in the rest of the world. So what makes us so strong?

## THE OBVIOUS:

1. We're a big country. Huge number of swimming pools per capita.
2. We're a middle class country with a population attuned in the middle class, to Olympic Sport and particular to swimming. So we have a **HUGE** number of swimmers. Other nations don't even really count their competitive swimmers well, so "as best we can tell", we have about half the world's competitive swimmers. *Lots of pools, lots of swimmers, lots of competition.*
3. Lots of **HIGH LEVEL RACING** at the college level. Other countries (whose athletes leave home to train with American College Coaches with American college scholarships to pay for it) may "talk down" the NCAA, but the athletes know the truth. Week after week after week of high quality racing in college makes you race tough and race smart. Nothing replaces the NCAA advantage (scholarships and all) anywhere in the world.
4. We can **FOCUS** on the Olympic Games. Our athletes, to receive funding, don't have to be "at their best" to get government funding every year. Most every other major swimming nation on earth demand taxpayer accountability for their money given to support swimmers. We don't. We let people build properly through a four- year cycle to **READY** in the Olympic Year. That advantage is huge. Yes, we are not very good very often at World Champs. But our athletes can cycle through full preparation for the Olympics. The "World's" are a distant, distant, distant second on our athletes' priority list.

## So what's the secret?

25,000 American Swimming Coaches with 25,000 **DIFFERENT** plans for developing world class athletes. No one "knows" how to develop Olympic Champions. It's a 'One-coach, one -athlete' equation that is different from every coach to every athlete. Each American Coach is **FREE** to choose the path they believe in. And a huge number fail every year and try again next year. And a large number **SUCCEED** every year and build on that success from year to year.

Contrast that with the other nations' tendency to "centralized plans" and "centralized thinking." Cookbook coaching doesn't work, idiosyncratic coaches with wild, crazy, different ideas and combinations of ideas do. And the free market approach sorts out the winners from the losers. How completely and typically **AMERICAN**.

## The RISK – (one example of multiple possible examples)

The Risk is in the idea of centralized planning when added in to performance. Bureaucrats and NGB-types talk up the (very minor) advantages, but ignore the (very large) risk. We have seen it over and over. A centrally planned error is driven out to **EVERY SINGLE CLUB AND SWIMMER**. A coach planned error is self-contained to that pool or that swimmer.

In the US, a team or a swimmer can have a "bad taper," but with the centrally planned nations the **ENTIRE COUNTRY** has a "bad Olympics." By avoiding central control, we not only get to optimize the advantages we have, we minimize the risk. It is much like diversifying an investment portfolio. Diversification allows you to capture market gains, while protecting you from risking it all on one company.

The **THREAT** to American swimming dominance (if one exists) is anything that **THREATENS** the ability of the American Coach to try exactly whatever he/she wants to try. "Boxing coaches in" with rules, regulations, expectations, etc. would be our downfall. The **ASCA** has always (since 1958) stood for the independence of American coaches to try every crazy thing they wish to try. And we need to stand for it more strongly than ever in 2017 and beyond. We keep ourselves free, we keep ourselves on top of the world of swimming. Thanks for listening.

All the Best,



History

Standing on the  
**SHOULDERS OF  
GIANTS**



**Yutaka Terao**  
First President World Swimming  
Coaches Association

**Jack Nelson**  
1976 USA Head Women's  
Olympic Coach

**Skip Kenney**  
1979 - 2012 Head Coach of the  
Men's Swimming Team at  
Stanford University

# Save the Date!

## WASHINGTON DC

Tuesday, August 29<sup>th</sup> through  
Sunday, September 3<sup>rd</sup>, 2017

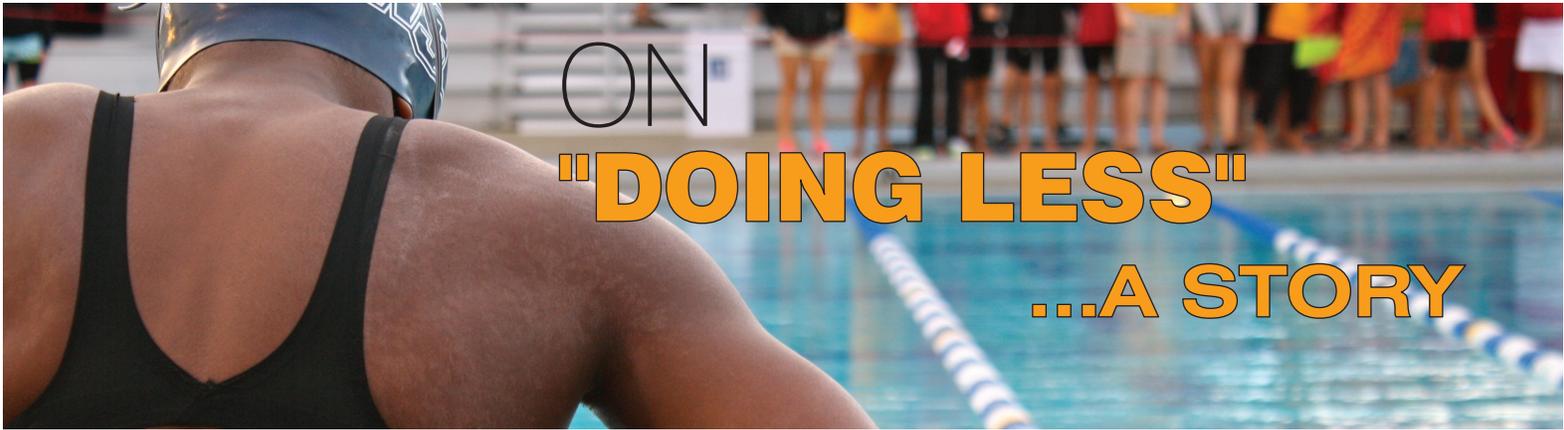


This will be a year to remember with talks from some of the top coaches in the profession:

- Bob Bowman
- Bill Roberts
- Dick Shoulberg
- Dave Durden
- And many more...

## WASHINGTON HILTON HOTEL

1919 Connecticut Avenue  
Washington, DC 20009



# ON "DOING LESS" ...A STORY

*Once upon a time, in a swimming pool in the far north,*

by John Leonard, ASCA Executive Directory

near the arctic circle in upstate New York, I learned a lesson. There was a lane we called "the national team." Some of these 8 or 9 bodies had national cuts and others just aspired to have the national cuts, and were close. They all thought they were special. They came early, they stayed later, they were "the National Team."

They weren't the only ones I had in the pool during this time, and I moved from group to group, so periodically, I'd pass them by and say something like "Nice Job. You guys are working hard, keep it up, Good Work." They improved when they went to swim meets and swam faster and faster.

One day as I walked past, I heard Lynn Scully say to Amy Richards, "hey, cut me some slack here, slow down, I can't go that hard right now." (for purposes of full disclosure, Lynn is a male, Amy a female)  
<br> Amy looked at him in a quizzical way, and went hard again. I ignored it and walked away.

The next day, I walked past, said "good job, Good work, makin' progress." Lynn and two other male swimmers didn't look me in the eye. Later in that practice, I heard Pete say, "Amy, I'm dyin' here, give me a break hey?" and heard Lynn chime in, "Yeah, no need to go this hard." And a third male say "Crap Amy, you're makin' us all work too hard to keep up with you!"

Amy slapped her hands on the water with frustration, gave up, stepped aside and moved to the middle of the lane to let Pete lead.

Our nationals Sucked.

I learned from this that we can be two kinds of people....the kind that encourages everyone around us to work hard and achieve more,

or we can be the kind that says "we don't have to work that hard to achieve more." We each of us have both people within us. And everyone who has ever coached or ever swum or ever competed knows this is the truth.

If just one person backs off, it lets the next weakest person do likewise. Its a disease, and it spreads fast.

After that lesson, I always paid attention to the "lane talk" in workouts. And I'd talk to my teams about how to encourage each

other to be achievers and how no one person in the group can achieve more than the group aspires to achieve. The group has got to get it right, and none can have the attitude that says "we don't have to work that hard."

And if they didn't want to be their personal best selves, they didn't want to train with me. They could train somewhere else and float through with some other coach.

I would say for awhile that I was "amazed" at how much satisfaction the swimmers took from encouraging each other to do more than they thought was possible.

Now, I look back and know it was not amazing at all. It was normal. Because, you see, we can all chose to be the person who

says "lets do less" or the person who says "lets swim faster." And once the team decides to only accept the positive input, there is nothing amazing about it. Its normal.

Since 1974, that experience left an indelible mark on me. It marked me with the knowledge that just one person who thinks they can "do less" can ruin a team, or a group, or an office, because we all have the capacity to sink, or to rise to leadership. Think about that when your team is swimming up and down that lane.

**Life, and this sport,  
does not reward those  
who "float through"**

**..it rewards those  
that enjoy the work  
for its own sake.**

# 2017 SPRING **CLINIC SCHEDULE**

## **USA-S RCC and ASCA Level 2 School**

Omaha, NE  
April 21-23, 2017

## **2017 ASCA Indiana Coaches Clinic**

Fishers, IN  
April 22-23, 2017

## **USA-S RCC and ASCA Level 2 School**

Charlotte, NC  
April 28-30, 2017

## **USA-S RCC and ASCA Level 2 School**

Hartford, CT  
April 28-30, 2017

## **2017 ASCA Levels 1 & 2 – Malaysia**

April 28-30, 2017

## **2017 ASCA Advanced Breaststroke Clinic**

Portland, OR  
May 11-13, 2017

## **Central States Clinic and ASCA Schools**

Oak Brook, IL  
May 18-21, 2017

## **2017 ASCA Levels 1 & 2 China**

May 21-23, 2017