A WIZARD IS NOT TO BE MADE IN A DAY

“There is a vast difference between telling how a trick is done and teaching how to do it. The existing treatises, with few exceptions, do the former only.

A wizard is not to be made in a day, and he who would attain excellence must be content to proceed as he would with music, drawing, or any other accomplishment—viz., begin at the beginning, and practise diligently until he attains the coveted dexterity.

Modern magic, Hoffman, 1876

Begin at the beginning…OK…where is the beginning ?

Almost no-one that we see is a true beginner, there may be some, but most casters coming for tuition will either already have had some instruction from friends or family or they will have watched videos and read books on fishing or casting and drawn their own conclusions on how to do it from that.

They will be processing information about casting and fishing, some useful, some not so useful, some true, some untrue, some recalled, some forgotten already and very little of it filtered by experience or practice.

Our first mission, as instructors, is to determine what that body of knowledge may be. What, if any, experience and practice a student already has. Their physiological capabilities. What are their motivations, their personal objectives, ambitions and needs?

This is the beginning. It is an absolute determinant in what you, as an instructor, are going to decide to do next. What you will teach and how you will teach it.

In this case we are going to look at new or novice casters who just want to go fish.

If we ask our casters to demo, out of all the possible casts, what we almost invariably see is an attempt at only one, very formal, example. The standard demo cast, CI task 1, a PULD and false cast cycle. Hips and shoulders squared up, facing the target cast direction.

Of course they do. It is the cornerstone of countless books, articles, and instructional programmes. A faultless performance of this cast is held up as the apogee of casting skill.

Who wouldn't want to be able to do that ? 😊

In this article, I want to ask a simple question:

Why do we present this cast as the ideal model for beginners to learn?

The words we use to name casts, a Roll Cast, a Single Spey, a PULD, are describing patterns that all fit a generally similar form. These patterns are stored in our memory as motor programs and are called **motor schema** (Schmidt, Schema Theory).

A PULD, representing a broad general movement pattern, comes in many forms, all of which would fit the underlying plan. Up, back cast, forward cast, down. A PULD on the flats is not the same as the one we might use on a tree lined stream, even though they fit the same basic movement model. Distances, angles, planes and terrain all change and each one drives a variation in the performance of the pattern.

For most recreational anglers, improvement in casting is simply a route to catching more fish. That is only going to happen if they can control the rod line system in a wider variety of conditions than they are currently able. To achieve this our casters need control over range and it is very often exactly this that they lack.

What we typically observe in the classic PULD is some combination of over-rotation, insufficient translation, excessive force, poor timing, and inaccurate tracking. In some casters there will be behavior where, in order to achieve a new objective, more distance perhaps, the caster is unable to do anything but

apply more force to the base movement pattern or increase or decrease the motion in an isolated joint.

For recreational anglers, their classic PULD pattern may be a **stable schema,** it's got them so far, but its reached the end of its usefulness because it only works in certain limited circumstances and the caster cannot yet adapt to new or changing conditions on the water. What they have learned, and reinforced, they cannot effectively change.

Seeing this kind of ingrained patterning is also predictable and it is often referred to as "muscle memory".

Why is this so common ?

One reason may be that repeatedly practising a single casting pattern trains the angler to solve a largely invariant task objective. Continuous attempts to reproduce an "ideal" output encourages the belief that this is the optimal cast. Adaptability, in this model, becomes something to be learned only after mastery of the ideal pattern.

The concept of an ideal cast fits neatly within a teaching model that is essentially: explain, demonstrate, copy, correct. Within this direct instructional framework, the instructor holds a mental image of ideal performance against which all deviations are measured. Errors are identified, faults diagnosed, and corrections applied. The underlying assumption is that expertise emerges through the progressive elimination of faults.

Presenting expertise in this way also explains why so many anglers demonstrate the classic over-the-shoulder PULD. Experts do it, instructors demo and teach it, therefore we should copy the experts and do what we're told. If accomplished casters perform the cast this way, it must be the correct method—even when, in a given practical situation, it clearly is not.

Persist with this approach long enough and the likely result is a highly constrained, low-error movement sequence which may be ideal for passing instructor assessments or winning casting competitions, but far less useful when kneeling beneath a riverside bush.

As previously mentioned, the type and rate of performance error is highly predictable.

Why is it predictable ?

Well…because it's normal.

Your caster is going to demonstrate some form of isolated movements of joints and limbs. The dominant joint in action is generally the wrist, sometimes the elbow, or shoulder, all accompanied by high body tension. This is called **freezing** (Bernstein, Degrees of Freedom), and it's perfectly normal.

You will often see a 1000 yard stare as they think very hard about the movement sequence they are trying to produce. This concentrated **cognitive demand** is also normal (Fitts and Posner, Stages of Learning) and it causes discontinuous, non-smooth, movement.

These two conditions alone produce what we see as "errors", deviations from the ideal task performance. Inconsistent loop control, timing errors, poor force application. The rates of error recurrence and the size of the deviation from the ideal indicate to us where on the learning continuum a caster sits. (Fitts and Posner, Stages of Learning)

It is crucial to recognize that the "errors" we see during the students performance are caused by cognitive behaviours that are completely normal in a period of early motor skill development. Anyone learning a new skill will exhibit these behaviours and it is simply not possible to "correct" it. It's going to happen and it will keep on happening at different rates until the student has full autonomic control.

What we attempt to do as instructors is to speed up the travel through these behavioural stages and to avoid or disrupt the establishment of unwanted muscle memory.

Decades of research tells us that people learn best by discovering solutions to problems for themselves. They do this in motor skills by testing the link between motion and an outcome and tweaking the movement if they don't get what they want. This repeating "sense, do, check, re-do" process is called a

perception action cycle. The experimentation and discovery is called **self optimization** and it is very important for promoting **retention** and **transfer**.

Retention is the casters long term ability to consistently reproduce the skilled performance. **Transfer** is the capacity of a caster to adapt what they have retained to new or variable environmental conditions. These are the two main standard tests of learning.

Transfer represents precisely the main objective of our caster, the ability to adapt movement to fit the changing sensory geography they experience out on the water.

We all rely on some sort of sensory feedback to verify objective achievement and we also know that vision is the dominant mechanism for sensory feedback whenever we fish or practice. This dominance means that sight is the easiest and simplest sense to leverage for both objective setting and confirmation. It involves making outcomes visible, something the caster can see and therefore self assess. Linking these two things is called a **perception action coupling**.

Finally, the feedback mechanism has to be independent. If the caster is relying on the instructor to verify whether an objective has been achieved or not, then they will be unable to transfer to the wild. By careful lesson design, instructors can intervene to both exploit and accelerate our hardwired tendency to learning by self discovery and the lesson becomes a full takeaway package of self verifiable practice drills.

Given what we know about vision dominance, if we start by positioning casters so that they are unable to see their back cast in the formal PULD demo cast stance, then we effectively remove 50% of their ability to observe the whole movement cycle. This actively retards the casters capacity to learn through visual cueing and feedback.

If we use “feel” or proprioceptive and kinaesthetic awareness as a feedback mechanism instead of sight we significantly retard **retention** because at this level it can’t be turned into a meaningful unambiguous communicable objective and it is not an accurate mechanism that a caster can use for objective verification.

Spend enough time working with recreational anglers and another recognisable behaviour emerges. During independent practice many follow the familiar mantra that improvement comes through repetition. And, of course, to some extent it does.

Repeating the same drill or routine over and over is known as blocked practice. Intuitively, it feels like the right approach, particularly if our objective is a largely invariant task. If we practise the same thing repeatedly, performance should improve.

Assuming we are practising the right movement, accurate execution eventually becomes automatic. This is indeed what happens, and blocked practice forms the foundation of many instructor training programmes and remains one of the most common teaching methods.

There is, however, a slight snag.

Blocked practice is highly effective at building consistency, but considerably less effective at developing adaptability. Fly fishing, if it demands anything, demands adaptability.

Employing blocked practice in casting instruction requires a twist in logic to allow the assumption that a wide range of control over force application, rotation, translation, timing, and tracking will emerge from repeated exposure to a fixed sequence of movements. In other words, we teach a narrow movement solution while expecting it to produce broad adaptability once the caster reaches the water.

In reality, describing every deviation from the ideal as an error, encourages precisely the opposite outcome. It reinforces the establishment of the very thing we are trying to correct, a largely invariant, habitual movement sequence, AKA muscle memory.

This may be a good business model, to create a problem that you can then charge to fix, but it is not ideal for the caster.

Because conditions on the water are in constant flux, a caster's primary need is the ability to select movement to meet the conditions. For recreational anglers, the most valuable skill we can develop is broad control over the key inputs rather than mastery of a single error-free pattern.

Counterintuitively, learning and adaptability appear to develop most effectively when practice is somewhat disorderly.

Research into motor learning dating back to the 1970s suggests precisely this. Shea and Morgan (1979) demonstrated that while blocked practice often produces rapid gains in short-term performance, it does little to prepare learners for novel or changing situations.

More recent research indicates that long-term learning and adaptability are enhanced when practice includes variability or combines different skills. Studies have consistently shown that varied practice improves both retention—the ability to maintain a skill over time—and transfer—the ability to apply it in new situations (Magill & Hall, 1990).

The implications for instructors are significant.

First, we need to reconsider what we mean by skill.

Traditional models define skill as the accurate reproduction of a movement pattern. This is indeed a skill, but the skill anglers actually require is the ability to select movement from a broad repertoire, even if that comes, initially, at the expense of perfect precision.

If our goal is to teach adaptability, then the focus of our drills must shift away from reproducing formalised casting patterns and towards developing control over the fundamental inputs. This doesn’t mean dumping the idea of teaching a cast schema altogether, it means designing drills that drive the emergence of patterns of movement that fit the schema but allow the inputs to be manipulated reliably to fit changing task conditions. Then the caster can generate whatever movement circumstances require, including the perfect demo PULD.

If we want to promote control over a wide range of motion within each pattern or schema, we need to reproduce this changing environment. Drills with high variability, alternating and contrasting movements, changing objectives, distances, planes, line configurations and environmental obstacles. By doing this we create a wide range of unpredictable problems that the caster has to solve which match as closely as possible what they will encounter in the wild.

Another common issue is the tendency for anglers to practise with line lengths they clearly cannot yet control. The ambition is admirable, but the result is often a cycle of repeated failure and frustration. The task simply exceeds their current capabilities.

Research by Robert and Elizabeth Bjork introduced the concept of desirable difficulty, demonstrating that learning improves when practice requires cognitive effort and is progressively challenging. Their work suggests that optimal learning occurs when tasks are neither too easy nor too difficult. This is known as the optimal challenge point.

Blocked practice gradually reduces challenge. As movements become automated, the brain invests less attentional resource in the task. By contrast, combining variability with carefully increased complexity forces the learner to remain engaged.

Because every caster develops at a different rate, instructors should continually monitor performance to identify and maintain this optimal challenge point. It provides a practical mechanism for regulating how quickly complexity and variability are introduced. This is the point at which performance ceases to be consistently successful and begins to break down. A useful rule of thumb is a success rate of approximately 60–70%.

At the same time, we must remain alert to signs of cognitive overload. Increased tension, hesitation, or movement freezing may indicate that the

learner has exceeded their current capacity. When this occurs, reducing complexity can provide a valuable cognitive reset and restore confidence.

So, should we completely abandon blocked practice?

Well….not totally. 😊

Variability is a powerful tool, but it is not always the ideal starting point. Beginners often benefit from short periods of blocked practice to establish fundamental mechanics and develop awareness of basic loop shapes.

Used appropriately, repetition can help casters recognise and understand the control variables that underpin all casting patterns. The key is recognising that these variables serve many solutions, not just one.

Once a meaningful connection has been established between movement and outcome however, introducing progressive variability becomes essential.

I realise some of the terminology is unfamiliar but the application of these basic principles to fly casting instruction is not only very easy to do, it's highly engaging and transformative for your students.

All this can be summed into a simple lesson structure which is stepped or spiralled, each stage reinforcing the last and all stages designed to produce wide ranges of controlled motion…which is what most recreational casters need.

Here are a few ways in which we can do this:

Make the learning objective explicit

Clearly explain what skill the drill is intended to develop. Identify the specific control element or elements being trained and why it matters. Learners need a reason for the exercise.

Create a simple, verifiable objective

The objective should be observable and independently assessable. This may involve line behaviour, loop shape, fly placement, or target accuracy. A clear outcome allows the caster to self-monitor and makes the drill portable for independent practice.

Vary loop shapes, distances, targets, planes, and trajectories

Alternate randomly between narrow and wide loops during false-cast sequences.

Change trajectories from low-FC/high-BC to high-FC/low-BC.

Use multiple targets positioned at different distances and angles, casting to them in random order rather than following a fixed sequence.

Introduce environmental variability

Practise in different wind conditions or simulate environmental constraints by altering casting positions. Use trees, bushes, uneven terrain, goalposts, or pitch markings to create obstacles and constraints that demand adaptation.

Vary equipment

Alternate between different rods, lines, line lengths, fly sizes, and fly weights. Each change requires subtle adjustments to all the control elements, strengthening adaptability across the entire system.

It is not only simple but also desirable, to position casters so that they can see both ways and cast horizontally cross body. It is equally easy from here to add variable drilling to encourage loop control, trajectory and plane changes. All continuously observable by the caster and therefore independently verifiable. This meets the requirement to teach range and fits all of the expectations of self optimization through a perception action cycle. It also significantly reduces issues with freezing

Lastly we can disrupt muscle memory and reduce freezing so that more joints and limbs are used in much the same way. Variable drilling in this context is called **contextual interference**. Weirdly, it can make performance worse in the

very short term but our long term objectives are increased retention and transfer and it’s proven to be very effective for that.

Conclusion

The central question is not whether the classic over-the-shoulder PULD is an effective cast, it is whether it should remain the primary model around which we organise early learning.

If the reality of fly fishing is that every cast is shaped by changing constraints—wind, current, obstacles, footing, distance, angle, fly size, and countless other variables—then adaptability is **the** principal skill we should be promoting right from the start.

Viewed through this lens, variability is not something to be introduced after technical proficiency has been established. It becomes a fundamental component of learning from the very beginning. It suggests that our role as instructors may be less about teaching anglers to reproduce ideal movement patterns and more about helping them develop control over the variables that generate those patterns.

Our goal with instructor candidates is mainly to create casters who can produce a near perfect cast on demand. For everyone else it is quite different, here we want to develop anglers who can solve the endless movement problems presented by the environment. Sometimes that solution will resemble the textbook PULD but most often it will not. Rather than asking, "Can they perform the cast correctly?", we might ask, "Can they adapt their movement effectively to achieve the desired outcome?"

Ultimately, success on the water depends less on the ability to repeat and more on the ability to adapt. If our teaching methods change to reflect that reality, we may find that anglers become not only more versatile casters, but more capable and confident problem-solvers wherever they fish.