

**GROWING SUBJECT MATTER EXPERTS – NATURE VS NURTURE****AUTHORS**

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**ABSTRACT**

Think of someone you know in the field of spill response who has deep technical expertise in a particular area. Now think about how they got to where they are. Chances are, they have a background in a related field, and stumbled into spill response opportunistically. They found it interesting, and set about investing time and energy in a particular area until they became recognised across the industry as a subject matter expert. If you look at your own career path, you may recognise similarities.

In the ‘nature vs nurture’ argument, this is ‘nature’ - the organic development of an oil spill expert over a long period, reliant on being in the right place, at the right time, many times over. So can an oil spill subject matter expert be nurtured and developed under a form of stewardship programme?

There are no shortcuts to developing deep expertise, but there are efficiencies to be realised. This is especially pertinent in today’s industry backdrop of cost-control and ‘doing more with less’ in the context of succession planning for future expertise. We need a structured, efficient and deliberate framework to build the next generation.

This paper will describe an approach to growing subject matter experts in spill response, which starts with OSRL’s 30-plus years of training oil spill experts, mixes in the

best from industry's graduate and SME development programmes and blends in techniques drawn from the UK's Royal Military Academy Sandhurst's officer training programmes and the world of sport psychology.

The approach is underpinned by the principles of andragogy – the method and practice of teaching adult learners – and designed around the distinct capabilities defined in the Tiered Preparedness and Response framework. In practice, the approach combines structured competence-based training, values based leadership, and focussed coaching and mentoring.

It accelerates the development of someone with no spill response experience and provides the building blocks which allow them to become a solid oil spill expert. For those who wish to specialise, it gives pathways and opportunities to achieving deep expertise in niche aspects of our discipline.

We can't strip out the need to be in the right place, at the right time, time after time... but this approach reduces the role that luck plays in an individual's journey to become an industry-recognised authority.

## **FROM THEN, TO NOW**

Oil spill preparedness and response has existed as a discipline for nearly as long as oil has been extracted, transported and stored. The subject of oil spill responder training and competence has featured regularly in International Oil Spill Conference proceedings since it became a theme in the 1975 Conference.

The advent of oil spill response organisations led to the emergence of professional oil spill responders. In the early days, responders were drawn from practical backgrounds

including the military, coastguard and shipping industry to perform hands-on clean up roles. Training was informal, semi-structured and opportunistic; a combination of knowledge being passed down from more experienced responders and learning through responding.

Over time, the breadth and depth of roles professional oil spill responders are expected to play has increased. During an incident, responders may be expected to:

- mobilise equipment, including managing inter-country and in-field logistics;
- advise on the development of response strategies using net environmental benefit analysis / spill impact mitigation assessment;
- develop, interpret and present technical response data, including oil spill models;
- take on key command centre roles – usually, but not limited to, roles within command and general staff, planning and operations;
- train and supervise vessel crews and inexperienced labour;
- deploy equipment and carry out cleanup;
- carry out field-maintenance on equipment;
- advise on the most appropriate use of new and emerging technologies; and
- liaise with scientists, communities, the media, lawyers and other stakeholders.

The oil industry goes to great lengths to prevent oil spills, and puts plans in place to reduce their impact should they happen. For plans to be effective, they must be realistic and grounded by the hard-earned experience of responders. It is a truism that the best oil spill consultants are responders, and the best responders have a deep understanding of oil spill preparedness. This leads to an extension of the roles responders can be expected to play:

- providing data for environmental impact assessments
- oil spill planning scenario development;
- spill modelling and sensitivity analysis;
- preparing oil spill contingency plans and tactical response plans;
- preparing detailed shoreline response plans;
- preparing specialist plans including response logistics; waste management and oiled wildlife planning;
- recommending, procuring and commissioning response equipment;
- delivering training;
- stakeholder engagement;
- advising on incident management systems;
- developing good practice guidance; and
- working with regulators and oil industry stakeholders to advocate good practice.

As the range, breadth and depth of competencies required of individuals has increased over time, oil spill response organisations have needed to develop their staff to be able to seamlessly flex between advocacy, consulting, training and responding. It is more appropriate and increasingly common to disregard the arena in which one applies knowledge, expertise and experience – instead thinking of Oil Spill Preparedness and Response (OSPR) as a whole, and referring to those in the profession as OSPR practitioners.

Over the past 30-plus years, Oil Spill Response Limited (OSRL) has developed in excess of 450 staff from a range of backgrounds into OSPR practitioners. In 2015 OSRL launched a programme to develop experienced generalist practitioners into subject matter experts (SMEs) within spill preparedness and response.

Setting out what it means to be an expert was the first step. The Oxford English Dictionary defines expertise as “expert skill or knowledge in a particular field”; it defines expert as “a person who is very knowledgeable or skilful in a particular area”. (OED, 2017)

Oil industry SME development programmes are in reasonable consensus that in the application of expertise, it is a function of proficiency and influence, resulting in impact. Individuals who lack impact could fall into one of two camps:

- someone who is highly proficient, with extensive and deep knowledge, but is unable to convey it to others; or
- someone with the ability to influence and communicate but who lacks substance.

Experts have both deep knowledge and the ability to influence and communicate it. Becoming an expert takes time. Author Malcolm Gladwell popularised the concept that it takes 10,000 hours of deliberate practice to become world-class in any field (Gladwell 2008). This can be traced back to a 1993 paper written by Anders Ericsson, a Professor at the University of Colorado, titled “The Role of Deliberate Practice in the Acquisition of Expert Performance”. When psychologists talk about deliberate practice, they mean practicing in a way that pushes one’s skillset as much as possible (Ericsson, 1993).

A 2014 Princeton study, titled “Deliberate Practice and Performance in Music, Games, Sports, Education, and Professions – A Meta-Analysis” found that the link between practice and mastery is less explicit. In a meta-analysis of 88 studies on deliberate practice, the Princeton researchers found that the amount practice made a difference in performance varied by domain. In music, the study found practice to make a 21% difference; in sports, an 18% difference; but in professions, just a 1% difference. (Macnamara, Hambrick, Oswald, 2014).

Frans Johansson explained domain dependency in his book “The Click Moment”, arguing that deliberate practice is only a predictor of success in fields that have stable structures. For example, in music and golf, the rules never change, so putting in the practice can help someone become the best. (Johansson, 2012)

In less stable fields – such as business or spill response – the rules change all the time, and are often thrown out the window. In these fields, the data does not support a direct correlation between the amount of deliberate practice and the degree of mastery.

"There is no doubt that deliberate practice is important, from both a statistical and a theoretical perspective. It is just less important than has been argued," the Princeton study's lead author, Brooke Macnamara, said. "For scientists, the important question now is, what else matters?" (Macnamara, Hambrick, Oswald, 2014)

Being clear that mastery is more than a matter of practice, and recognising that oil spill preparedness and response is not a stable domain, OSRL set out to answer the “what else matters?” question. This involved peeling back the layers of what it takes to become an OSPR expert, and build a development programme that addresses all of them.

OSRL’s conclusion is that there are several components of an oil spill expert:

- Mindset – the psychology of an individual.
- Competence – the theoretical knowledge, understood and applied in practice.
- Experience – credibility and confidence developed through ‘doing the job’
- Impact – the ability to flex style in order to influence and lead – in advocacy, preparedness and response domains

## **APPLYING SCIENCE AND BEST PRACTICE TO THE PROBLEM**

### **The learning machine**

The human brain is a learning machine. In our early years, our brains helped us learn how to feed, walk, talk and navigate our way through a phenomenal number of different challenges. Our ability to learn is innate – it is hard-wired into our design.

The starting point of OSRL's learning and development philosophy is that people have the potential to continuously deepen their own knowledge and skills, and that learning comes naturally to people – this is nature. OSRL applies a structured, deliberate but flexible approach to developing staff, leveraging this innate desire to learn – this is nurture.

This approach is based on the 70:20:10 Model for Learning and Development, which originated from Morgan McCall, Robert Eichinger and Michael Lombardo's work at the Center for Creative Leadership (Lombardo and Eichinger, 1996). The model holds that:

- 70% of learning occurs from real life and on-the-job experiences, tasks and problem solving;
- 20% of learning occurs from feedback, observing others and working with role models and mentors; and
- Just 10% of learning occurs from formal training.

OSRL combines high-impact formal training, bespoke leadership development, state of mind coaching, structured mentoring and feedback systems with real life oil spill preparedness and response experience to develop the mindset, competence, experience and impact of OSPR practitioners.

Success demands a deliberate approach tailored to the needs of the individual. OSRL has found that the single biggest factor in increasing the effectiveness of learning is something professional sports teams have long understood – mindset.

### **‘State of mind’ performance coaching**

Most organisations seek to become high performing. In recent years, the world of business has learned much from the world of professional sports about performance of individuals – in particular the importance of mindset.

When an individual’s development is impeded by a failure to learn from training, feedback and on-the job experience, this is often due to high stress levels, a lack of mental clarity, distraction or something similar - termed ‘mental interference’.

This understanding was popularised by Timothy Galwey’s pioneering work on the ‘Inner game of tennis’ (Galwey, 1975) and is explained best by the performance equation:

$$\textit{Performance} = \textit{potential} - \textit{interference}$$

When an individual’s potential (their competence, experience and ability to have impact) is diminished by mental interference, reducing and eliminating that interference is critical to enabling them to learn, develop and achieve high performance.

In order to do this an approach is needed that supports and teaches an individual about their mindset and ability to learn. It is obvious that the failure to acknowledge and develop a person’s inner resources will lead to a failure in their ability to drive and direct their own learning and performance. State of mind performance coaching specifically addresses this.



Consider two individuals with identical knowledge and skills. When put in an identical high pressure scenario - why is it that one flourishes whilst the other falters? The difference in their performance is usually what they are thinking or their relationship to their thinking before, during and after the event – their levels of interference.

Mental interference is an invisible force that acts on everyone. In the example above, the difference between the person who thrived and the person who faltered, was the level of interference and more specifically, the extent to which each paid attention to it.

Paying less attention to mental interference is entirely learnable. Once a person learns about interference – their own thinking – they begin to change their relationship with their thinking. By recognising the whirlwind of thoughts in their mind for what it is, and paying less attention to it, anyone can achieve clarity – they can get into the zone. Whilst some find it easier than others, anyone can learn to recognise, acknowledge and reduce interference.

Professional sport has known this for many years and performance coaches regularly work with an athlete's psychology. An example of this is the cycling team – Team Sky – which worked with the psychologist Steve Peters (author of the Chimp Paradox). Peters helped the team to better understand how their inner resources could be directed effectively. The results of this, combined with work on marginal gains (accruing many small improvements), helped Team Sky win two *Tour De France* races with two different riders (Alred, 2016).

Athletes are not expected to just 'turn up' and perform – races are the culmination of years of deliberate practice combined with coaching to ensure they have the right mindset.

In any domain, individuals with high potential sometimes become high performers – but the speed at which they develop and the amount of potential they access varies and is subject to a range of factors.

In developing OSPR experts, OSRL takes a lead from professional sport – there cannot be an assumption that expertise will flourish by chance. OSRL focuses on creating a learning culture in which employees can understand their own psychology, in particular the role of their own thinking in the performance equation. With this foundation in place, individuals are able to achieve a productive and clear state of mind, meaning that learning and ‘deliberate practice’ becomes more effective. This is seen particularly in the ‘on the job learning’ where the lessons an individual takes from preparedness projects and spills become deeply embedded more quickly – aided by the frequency and diversity of projects and responses and individual is matched to. In the domain of developing OSPR experts, this means two things – firstly, irrespective of an individual’s makeup, preferences and background, effective OSPR practitioners can be developed in a shorter space of time; and secondly, the results are more consistent in terms of quality and performance.

### **Designing and delivering OSR training that is memorable and sticky**

The science of understanding and supporting learning in adults is known as andragogy. In order to maximise the value and impact of any training, it is important to understand how adults learn best (Knowles, Holton and Swanson, 2015).

Consider conventional training, which rarely applies the principles of andragogy – a ‘talking trainer’ who transmits knowledge to the listening learner, interspersed with energisers and tasks that are frequently poorly placed or considered. Anyone who has

endured this style of training would agree this is a passive and ineffective method of learning, yet the approach is still commonplace.

Adult learning is based upon comprehension, organisation and synthesis of knowledge rather than rote memory. Well designed training aimed at adults recognises these principles:

- **Adults must want to learn.** They learn effectively only when they are free to direct their own learning and have a strong inner motivation to develop a new skill or acquire a particular type of knowledge.
- **Adults will learn only what they feel they need to learn.** Adults are practical in their approach to learning; they want to know “is it relevant to me and does it meet my goals?”
- **Adults learn by doing.** Adults learn through active participation and practice – this helps in integrating component skills into a coherent whole.
- **Adult learning focuses on problem solving.** Adults start with a problem and work to find a solution. A meaningful engagement, such as posing and answering realistic questions and problems is necessary for deeper learning.
- **Experience affects adult learning.** Adults relate learning to their own experiences – they view learning through their individual perspectives. This can be an asset or liability – for example if prior knowledge is inaccurate, incomplete or naïve, it can distort the integration of new information.
- **Adults learn best in an informal situation.** Adults learn when they have a goal and purpose to learn for. Being in an inviting, collaborative and networking environment as an active participant makes it efficient and effective.

- **Adults want guidance and consideration as effective partners in the process.** Adults want to choose how they learn based on their individual needs – they want to evaluate what helps and what does not, and have an input into the shape and direction of training.

OSRL integrates these principles into the design of ‘brain-friendly training’. Brain-friendly training helps individuals access learning by exploring their own learning preferences to understand how they learn best. Brain-friendly training flexibly engages the three learning preferences – visual, auditory and kinaesthetic (learning through doing).

Establishing the right mind set to learn, and designing training to maximise impact provides the framework into which any technical curriculum can be placed.

### **The OSPR Curriculum**

OSRL’s technical curriculum is based on the Tiered Preparedness and Response (TPR) framework (IPIECA-IOGP, 2015), coupled with supplementary and enabling skills. This technical curriculum is expressed through a suite of role-specific vocational competency standards. The vocational standards are structured around the 15 capabilities articulated in the TPR framework, together with incident management systems and other supporting capabilities. Each standard sets out the competencies expected of individuals in specific oil spill preparedness and response roles, from operator-level through to highly experienced generalist practitioner.

The competencies are split into two aspects – underpinning understanding (theory), and in-role performance (actually doing the job). Individuals working towards a vocational competency standard submit evidence against specific criteria. This is considered by qualified Assessors who make a judgement as to whether the evidence meets the criteria. Assessors are

monitored by qualified Verifiers. Verifiers' role is to ensure assessment judgements are consistent across the whole competency management system.

OSRL's competency management system is approved by OPITO, the oil and gas industry's focal point for skills, training and workforce development. This provides a high degree of external assurance that the competency system is robust and reliable. Individuals working towards vocational standards accrue evidence mainly through real life, on the job experiences, tasks and problem solving – where 70% of learning occurs.

### **Technical training**

OSRL's formal training is designed to be impactful and to accelerate competence development. The two cornerstone technical training courses OSRL practitioners attend are Responder Training and Advanced Technical Training.

Responder Training is a 13 week course that new joiners undertake, and covers the knowledge, skills and experiences required to act as effective oil spill responders. It provides solid foundations upon which to base an OSPR career, and is the fastest way of developing and assuring complete professional responders. The course combines classroom, scenario-based and practical training, led by experienced practitioners.

Advanced Technical Training is an intensive two-week course that individuals attend once they reach particular career milestones – usually 18–36 months into a career with OSRL. The training is designed to establish a cohort of peers and put them in contact with the organisation's best technical experts and selected external experts, to provide a more advanced baseline that allows future learning to be accelerated. The curriculum follows the

15 capabilities of the Tiered Preparedness and Response framework, together with IMS. The course combines classroom and scenario-based training.

The principles of andragogy are hard-wired into these ‘brain friendly’ courses, and the learning goals of the individuals are core – individuals are highly participative in shaping the learning and are partners in the learning process.

### **Developing subject matter experts**

In 2015, OSRL launched a framework to help individuals deepen their expertise further. The Subject Matter Expert Programme is intended to allow OSPR generalists with the requisite ability, aspiration and engagement to specialise in one of seven disciplines:

- **Dispersants** (surface and subsea application);
- **Surveillance, Modelling and Visualisation;**
- **Shoreline** (protection of sensitive resources, SCAT, shoreline cleanup);
- **Offshore** (at-sea containment and recovery, in-situ burning);
- **Inland** (waterways / bodies of water, spills on permeable or impermeable surfaces);
- **Cold Weather** (all response techniques applied in cold weather environments); and
- **Incident Management Systems.**

The intent of the SME Programme is to develop a cadre of world class subject matter experts in these oil spill preparedness and response disciplines. Each discipline has a Core Group, which acts as the centre of excellence and is charged with developing the competence of those within it, and OSRL’s wider OSPR practitioner population.

Each Core Group is led by senior technical staff, supported by internal mentors, and maintains relationships with key industry-acknowledged experts. These external ‘industry sponsors’ coach and mentor the core groups, providing guidance, direction and perspective.

A responder’s technical development is complemented by a range of enabling skills development initiatives. Key focus areas are personal effectiveness, leadership, emotional intelligence, as well as trainer and presentation skills. This holistic view of the individual makes them a force-multiplier when deployed on a response, whether it is leading a team of contractors on a shoreline, or acting as a senior technical specialist in the command centre.

### **Leadership development**

OSRL’s leadership development programme takes the best aspects of corporate leadership programmes and blends them with the British Army’s approach to leadership development with the emphasis being on developing emotionally intelligent leaders who are role models for our corporate values and put their followers’ needs ahead of their own self interest. The programme is broken down into 3 stages:

The first stage is designed to equip OSPR practitioners with the knowledge and skills to be effective influencers and to achieve results without positional power. The focus is on ‘doing leadership’ at a relatively junior level such as motivating labourers to work harder during a shoreline cleanup through good interpersonal skills and personal example alone.

The second stage is geared towards supervisory leadership and is designed to equip more senior OSPR practitioners with the knowledge and skills to lead and manage teams effectively, whether in day-to-day roles at OSRL, in the field or in the command centre.

Stages one and two are delivered by internal staff and so are highly contextualised and bespoke to the unique needs of a response organisation – individuals who can function in one mode during peacetime, and switch gears during a response.

The third stage is designed for senior leaders and highly experienced OSPR practitioners and covers leading for peak performance. It is a residential programme which uses intensive 360 degree profiling in order to generate valuable insights which individuals then build upon over the course of three immersive modules.

### **Pulling it together**

Even the best ‘nurture’ frameworks, programmes and initiatives to enable the development of OSPR experts will fail if the wrong people are selected to undergo them. Not everyone is cut out for the spill preparedness and response industry. The recruitment of the right individuals is the final and most critical piece of the jigsaw.

It starts with demand planning, underpinned by a detailed and up to date understanding of the current and anticipated requirement. This is achieved through short and long term horizon scanning, with an underlying intent to maintain a balanced pipeline of talent. The demand plan enables recruitment to be targeted at particular future skills gaps or needs so the right people can be put in the right place at the right time.

Once a requirement to recruit is identified, OSRL invites applications. Applicants come from a broad range of backgrounds, with a wide variety of qualifications and experience. Competition for places is fierce – there are typically 8-9 applicants for every vacancy. Applications are filtered based on knowledge, skills and experience, and applicants are invited to complete a suite of psychometric and ability tests.



The psychometric testing comprises the Occupational Personality Questionnaire (OPQ). The OPQ measures 32 facets of personality and is one of the most widely used tools of its kind in the world. It was placed “at the top rank of personality tests” by The British Psychological Society (BPS), in its 2007 review. It is a measure of an individual’s preference towards certain ways of thinking, feeling and behaving. The BPS rates the validity and reliability of the OPQ as ‘good’. (BPS, 2007).

Ability tests consist of inductive, numerical and verbal reasoning. Inductive reasoning assesses an individual’s ability to understand incomplete information and solve novel problems by creating solutions from first principles – critical in to oil spill preparedness and response. Numerical and verbal reasoning assesses an individual’s ability to understand or interpret numerical data and written reports respectively. The highest scoring candidates are invited to attend an assessment centre. Assessment centres comprise five activities which are directly related to the components of an oil spill expert – mindset, competence, experience and impact:

1. A classroom based planning exercise – to assess how candidates react to stress and work together to achieve shared goals (*mindset, competence, impact*).
2. Individual presentation – to gain an insight into the candidate’s interests and experiences and their ability to communicate these with energy and passion (*experience, impact*).
3. Behavioural competency interview – recognisable as a conventional job interview, designed to elicit examples of where individuals have previously demonstrated certain behavioural traits (*competence, experience*).
4. Practical team building task – to assess practical aptitude. Candidates are typically given a piece of response equipment to assemble as a team (*mindset, competence, impact*).

5. Base tour – an opportunity for candidates to ask questions about the role and the organisation from an experienced member of staff. It also enables the tour guide to gain more insight into the candidate’s motivations for wishing to embark on a career in oil spill preparedness and response (*mindset*).

Up to ten senior leaders and experienced OSPR practitioners are involved in every assessment day. All submit independent objective assessments of candidates after each activity and participate in the integration and levelling of scores at the end of the day. Candidates with the highest scores are matched to the demand plan and offered roles.

New starts at OSRL then undertake a company induction and embark on the 13 week Responder Training course. Their ongoing development and progress through the organisation is very much self-owned – a key principle of andragogy.

One tool for this blends the science of performance coaching with the TPR Framework and the enabling soft skills, in the form of a performance profile. This is a coaching and feedback tool enabling increased self awareness that allows development needs to be clearly identified and capability gaps to be closed quickly and efficiently through tailoring on-the-job learning by matching opportunities to work on projects or spills to competencies and identified development needs – in a systematic and deliberate manner.

OSRL has found that when OSPR practitioners are selected well, maintain the right mindset, and are handed the keys to their own development – via the various frameworks outlined above – learning is effective, impactful and continuous. This is further leveraged through matching individuals with internal and external mentors and coaches to help balance the performance equation, and ensuring that ‘on the job’ learning – where circa 70% of the an

individual's development comes from, is effective through the matching of individuals to projects and responses based on the needs of the job and the needs of the individual.

## CONCLUSION / SUMMARY

OSRL has established that in the nature vs nurture argument, both are critical. 'Nature' means recruiting the people with the right attitude and aptitude; 'Nurture' means optimising their environment and experiences to maximise their development in terms of mindset, competence, experience and impact. Over 30-plus years, OSRL has continually evolved the recipe for creating respected OSPR practitioners. The recipe – described above in terms of the frameworks and philosophies – clearly works. Alumni of OSRL's training and development include many industry recognised authorities. Individuals for whom mental interference is low; potential is reached and high performance is achieved and sustained.

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