

Research insight
February 2014

Fresh thinking in
learning and development
Part 3 of 3

Insight and intuition



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Fresh thinking in learning and development

Part 3

Insight and intuition

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This report was written by Professor Eugene Sadler-Smith, University of Surrey, with Dr John McGurk, CIPD.

Background

This report forms part of stage two of research launched in 2012 to challenge tried and tested models of insight and diagnosis such as Myers-Briggs, learning styles and other such approaches, and build fresh insight for L&D. Through our 2012 *Learning and Talent Development* survey, conducted in partnership with Cornerstone OnDemand, we identified extensive use of traditional techniques and low awareness of emerging practice such as neuroscience, cognition and wider cognitive processes such as intuition and thinking skills. We outlined our

survey findings in our 2012 report *From Steady State to Ready State: A need for fresh thinking in learning and talent development?* and set out to develop newer insight. These new insights are critical, in our view, to developing curiosity, the driving behaviour of L&D professionals. This new series of reports, written with key experts, allows us to tap into the insight potential of new areas. The intention is that this will help build the capability which helps L&D build its role at the centre of organisational learning.

These three research insight reports cover:

- neuroscience and learning
- cognition, decision and expertise
- insight and intuition.

This is the third in the series and addresses intuition and insight, linking them to the behaviours of creativity and innovation.

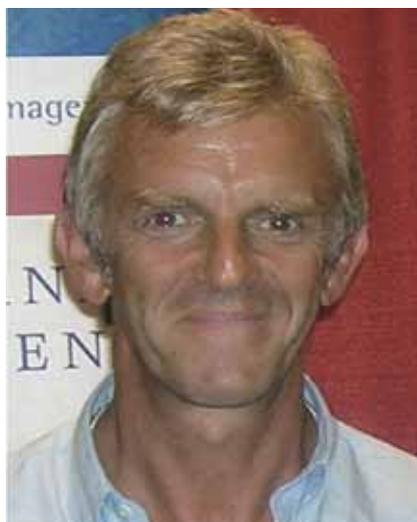
Acknowledgements

The CIPD wishes to thank the community of learning and development practitioners who made this series possible by completing our 2012 survey and allowing us to tap into both the steady and ready states of L&D practice. We also wish to thank those practitioners who joined

our winter 2013 webinars and who participated in the webinar delivered by Professor Sadler-Smith. We want to thank Mike Morrison of RapidBI and Martin Couzins of LearnPatch for facilitating those webinars and helping deliver some of the insights we used in this report. Finally, thanks are owed to

Professor Sadler-Smith for providing us with his expertise and giving us real insight into the key thinking skills of intuition and insight.

About the author



Eugene Sadler-Smith is Professor of Organizational Behaviour in the Surrey Business School, University of Surrey, UK. He has a BSc in geography from the University of Leeds and became a university lecturer in 1994. Prior to this he worked in the HRD function of British Gas plc. His PhD (School of Education, University of Birmingham, 1988–92) was on cognitive styles and learning in computer-based training and completed while working for BG plc. His current research interests centre on the role of intuitive cognition in management and learning. His research has been published in peer-reviewed journals such as *The Academy of Management Executive*, *Academy of Management Learning and Education (AMLE)*, *British Journal of Psychology*, *Business Ethics Quarterly*, *Human Resource*

Development International, *Journal of Occupational & Organizational Psychology*, *Journal of Organizational Behavior*, *Management Learning*, and *Organization Studies*. He is the author of a number of books including *Learning and Development for Managers: Perspectives from research and practice* (Blackwell, 2006), *Inside Intuition* (Routledge, 2008) and *The Intuitive Mind: Profiting from the power of your sixth sense* (Wiley, 2010). He's also joint editor-in-chief of *Management Learning* and on the advisory boards of a number of other journals. He is a Chartered Fellow of the CIPD and his previous research for the CIPD includes the report *Using the Head and Heart at Work*.

Executive summary

'The ability to tap into insight and intuition and to use these to drive innovation is increasingly critical in a wide range of business areas.'

Intuition and insight are two of the key thinking tools we use to make sense of our world. Whether it's a sense of knowing or understanding or a deep informed hunch based on expertise, intuition and insight can work together, helping us clarify our thinking and make decisions. Insight is about how we come to understand things and intuition is, in essence, about how we think, reflect and act. Both are aspects of the cognitive skills we use in everyday life. Intuition and insight are more abstract than other cognitive skills such as numeracy and verbal reasoning, but they have a demonstrable and often disproportionate impact on thinking effectiveness. This is especially the case in environments where people require 'interacting' with others to develop value out of knowledge. The ability to tap into insight and intuition and to use these to drive innovation is increasingly critical in a wide range of business areas. In effect, the cognitive skills of analysis and judgement have to be increasingly supplemented with thinking skills. In a sense, the cognitive skills are the hardware, the operating systems of thought, and the thinking and perceiving skills are the software.

Professor Eugene Sadler-Smith, who prepared this report with Dr John McGurk of the CIPD, worked with the CIPD on the first stage of this project and on the 2012 report *From Steady State to Ready State: A need for fresh thinking in learning and talent development?* He is a leading academic specialist and published author on

intuition as a key management and leadership skill, and an acknowledged expert interpreter of the thinking and learning areas. He helps guide our discussion of these critical thinking skills.

In the first section of this report he looks at the critical importance of insight and intuition to our thinking skills, particularly:

- how insight – one of our highest-level skills – leads to ideas (or ideation) and how this in turn drives innovation, examining concepts such as ideation, which helps us conceive and generate ideas
- how attention to both skills helps develop creativity and problem-solving, drawing on the early insights of psychology and examining the processes of mental preparation, incubation, illumination and verification, which help us to process and channel ideas
- concise thinking tools such as RAT, which help us to prepare our minds for insight and intuition
- how this helps build the mindset to drive innovation, looking at the processes that lead to the light bulb moments
- what blocks or hinders intuition and insight, in particular tunnel vision and grooved thinking. Awareness of these obstacles can help us unfreeze such thinking.

The second section outlines the scientific research on insight and intuition, especially focusing on the neuroscience and cognitive

research recently conducted using imaging techniques such as EEG and fMRI, and new research on the power of unconscious thought in generating these key thinking tools.

- The report then looks at the cognitive process of incubation, which helps to preserve and regenerate ideas. Using iconic examples from the invention of the Polaroid camera to the Post-It note, Professor Sadler-Smith looks at how these processes are critical to the neural activation of the processes of intuition and insight.
- This is followed by a discussion of the importance of mood and temperament to the exercising of both key skills, from the fact that negative moods can impede thinking and insight to the discovery of a positive relationship between a happy temperament and creativity.
- These ideas are summarised by a thinking tool which captures the key points of ideation, incubation and mood.

The third section of the report concerns the organisational learning aspects of intuition and insight, particularly:

- the business value of innovation and how it's supported by intuition and insight. We look at how the management agenda on intuition, insight innovation has grown since Chester Barnard popularised its importance as a key set of operational skills. The importance of tuning into the analytical and intuitive

mind states is explained, and latter-day exemplars such as Steve Jobs and Bill Gates are used to examine its continued development as a centrepiece of leadership

- how expertise and knowledge can be harnessed within organisations. In particular, we look at the work of Klein and the issues around expert insight and judgement. This leads to a discussion and examples of how managers use their expertise, and the levels at which different key thinking skills are normally exercised
- tools and templates for appraising intuition and insight levels in organisations and teams. We outline some basic tools which help balance intuition and gut feel for example, as well as one to support problem definition and critical thinking.

Finally we provide some concluding views and practice pointers for getting the best out of intuition and insight. Reading this report and the related reports *Neuroscience and Learning* and *Cognition, Decision and Expertise*, practitioners will get a good sense of how to use the key cognitive skills in their work. This resource will also help in equipping learning and development specialists as the curiosity champions of the organisation, a role which is increasingly needed as we take a wide perspective of learning.

Dr John McGurk, CIPD

1 The importance of innovation and insight

‘Innovation is a multi-phase process and, in order to innovate successfully, organisations have to manage each of the different phases effectively.’

Improving ideation through insight

Almost two decades ago Peter Drucker, one of the greatest management thinkers of the twentieth century, argued that modern organisations must be organised for *‘the systematic abandonment of whatever is established, customary, familiar and comfortable’* and that innovation is the de-stabiliser which enables the *‘creative destruction’* of the steady state for the necessary and constant changes to occur (Drucker 1995).

Destabilisation is a stable fact of organisational life. For example, since the 1990s the major grocery retailers in the UK have been competing in the ‘space race’ (‘carpeting the country with superstores’), but a recent Business Leader column in the *Guardian/Observer* (‘Supermarkets sense that size may no longer be the key to conquering universe’) reported that it’s suddenly dawned on supermarkets that size isn’t necessarily what matters. Retail analysts have predicted ‘cataclysmic shifts’ as shoppers

reorient their habits to shopping in smaller outlets, more often and more online. The familiar and comfortable world of the superstore is being replaced in the UK with a very different model to which the major grocery retailers now have to respond in increasingly innovative ways.¹ What was once said about the oil business is pertinent across business: *‘There is only life after oil if you do something other than oil’*;² innovation is the key to surviving and thriving.

Innovation is a multi-phase process and, in order to innovate successfully, organisations have to manage each of the different phases effectively. Conceiving and generating new ideas (‘ideation’) is the most vital ‘front-end’ phase of this creative process, but ideation itself is driven by the insights which foster individual employees’ creativity. Therefore, in order to manage innovation, managers need to understand the ‘front end’ and know how to manage it more effectively (Fiedler 2012, Reinig et al 2007) (see Figure 1).

Figure 1: Insights are at the ‘front end’ of innovation



While it's recognised that group processes (for example 'brainstorming') are also vital ingredients for idea generation, the focus of attention in this report is on the role of the individual's thinking processes in innovation, that is, '*innovation which appears at the individual level and which is mainly responsible for the generation of new ideas*' (Shavanina and Seeratan 2003).

Creative problem-solving and solution-seeking

In his 1926 book entitled *The Art of Thought*, the educator and social psychologist Graham Wallas (1858–1932) of the London School of Economics proposed what has come to be a classic account of creative problem-solving which resonates with many people's personal experiences. Wallas studied the accounts of creative

problem-solving of artists, scientists and inventors and identified a common four-stage process which, although 'too rigid' to be a model of what happens in all instances, is still highly influential (King and Anderson 2002, p70) (see Figure 2).

Figure 2: Wallas's four-stage model of the insight process (based on description in Seifert et al 1995)



The phenomenon of insight may be familiar to many of us: it's the sudden appearance of a solution ('illumination'), often when we're least expecting it, to a problem that's been perplexing us for some time (an 'impasse'). One of the key ideas that emerged from Wallas's model and subsequent research is that we can sometimes think too hard; solutions to difficult problems as well as great ideas rarely turn up on demand.

The classic case is the apocryphal story of Archimedes, who, after struggling with a seemingly intractable problem for some time, had a sudden and unexpected realisation of the solution while in his bath (the problem was to do with how to measure the density of a metal crown and the solution was triggered by the increase in water level he happened to observe as a result of the displacement of the bathwater as he immersed his body

in it). The story goes that he ran down the street naked, exclaiming 'Eureka' (meaning literally 'I have found (it)').

A simple illustration of how incubation and illumination work is to be found in the so-called Remote Associates Test (RAT) psychologists use to research insight. For example, what word connects 'cottage', 'Swiss' and 'cake'? Finding the solution requires finding

a word that links semantically distant (that is, remote) words. The theory of insight suggests that the processes involved:

- take time (that is, they have an incubation period)
- are unconscious (that is, only the outcomes are available to conscious awareness)
- may be helped by putting the problem to one side (diverting one's attention) or thinking about something unrelated (that is, switching one's attention).

Innovation and inspiration breaking through the thinking barrier

This last point is a vital one and is encapsulated in Louis Pasteur's aphorism: *'Chance favours the prepared mind.'* In other words, insights often involve a 'joining together of the dots'. But the dots have to be there in the first place to be joined up; therefore, a level of knowledge and expertise is required for insight to occur, especially in conceptually and technically complex fields. To return to Wallas's stage model: the acquisition of the necessary expertise is vital as 'mental preparation' for idea generation in scientific and technical discovery and business innovation. Insight may be a manifestation of the 'cognitive unconscious' at work in

science, technology and business, but it's far from 'naïve' and all it sometimes takes is a chance or opportunistic mental nudge for the pieces of the jigsaw to effortlessly fall together.

In the Gestalt psychology view of problem-solving, prior knowledge and expertise can be a barrier to creativity³ in that creative problem-solving occurs when the problem-solver sees how the various elements of a problem can be fitted together holistically in a new way that isn't reliant on an established way of seeing the problem (King and Anderson 2002). An implication of this is that although expertise can provide the raw materials for idea generation, a downside of expertise is that it can give rise to 'tunnel vision', 'strategic myopia' or 'grooved thinking'; to avoid this our conventional, customary and comfortable ways of thinking must be challenged periodically by the surfacing and sharing of mental models and overcome 'cognitive inertia' (Sparrow 2002), which is anathema to innovation.

Wallas, in his four-stage model of insight, actually described an additional sub-stage between incubation and illumination: *'that moment in the illumination stage when our fringe-consciousness*

of an association-train is in the state of rising consciousness which indicates that the fully conscious flash of success is coming'. Wallas referred to these as 'intimations' (from the Latin *intimare*, 'to announce'), a feeling that the direction we're following is the right path or that a breakthrough is about to happen (Sadler-Smith 2008, p75). We find these 'creative intuitions' in Nobel prize-winning scientists' accounts of their discoveries, for example:

- 1 *'I think, we almost felt at times that there was almost a hand guiding us. Because we would go from one step to the next, and somehow we would know which was the right way to go. And I really can't tell how we knew that, how we knew that it was necessary to move ahead.'* (Michael S. Brown, Nobel Prize in Medicine, 1982)
- 2 *'To me it is a feeling of ... "Well, I really don't believe this result" or "This is a trivial result" and "This is an important result" and "Let us follow this path". I am not always right, but I do have feelings about what is an important observation and what is probably trivial.'* (Stanley Cohen, Nobel Prize in Medicine, 1986)

2 The science of intuition and insight

Searching for intuition: the emerging research

Management researchers have referred to these feelings around intuition and insight as an 'inexplicable sense' of what 'might be possible' (Crossan et al 1999). No less a figure than Albert Einstein suggested that intuitive leaps occur through a focusing of attention on '*certain repeatedly occurring complexes of sense impression*' which is '*not yet thinking*' and which becomes communicable when it is '*connected with a sensorily cognizable and reproducible sign (word)*' (Vandervert 2003, pp26–7). However, creative intuitions may or may not lead to creative outcomes.

At the level of the brain mechanisms involved, neuroscientist Mark Beeman and colleagues – in a series of studies using functional magnetic resonance imaging (fMRI) and electroencephalography (EEG) – found striking increases in neural activation in a region of the brain's right hemisphere (RH) called the anterior superior temporal gyrus (aSTG⁴) when participants solved insight problems (in this case RATs) compared with when they solved non-insight problems (Jung-Beeman et al 2004, p0507). Jung-Beeman and his colleagues argued that the RH aSTG facilitates the integration of information across distant semantic relations, thereby enabling problem-solvers '*to see connections that had previously eluded them*'. In the

same experiments a corresponding very short burst of alpha activity in the visual processing region at the rear of the RH was seen to take place; they interpreted this as the suppression of activity in this region, thereby freeing up resource for the brain to concentrate on solving the immediate insight problem 'undistracted', so to speak.

More recently psychologists have further developed Wallas's idea of incubation into the concept of 'unconscious thought', defined as a '*goal-dependent, deliberative process in the absence of conscious attention*'.⁵ According to one of the originators of 'unconscious thought theory', Maarten W. Bos of Harvard, unconscious thought can integrate a large amount of information, process it holistically and fuel the creative process. For example, in a laboratory study by Bos's colleague AP Dijksterhuis, participants who engaged in unconscious thought produced ideas that were newer and more original than those who thought hard about the problem. They concluded that unconscious thought is more 'liberal' (that is, associative and divergent) than conscious thought (which is focused and convergent) and leads to idea generation and that, when confronted with a task that requires a creative response, it might pay off to delegate mental labour to the unconscious mind (Dijksterhuis et al 2006, Dijksterhuis and Meurs 2006).

'...participants who engaged in unconscious thought produced ideas that were newer and more original than those who thought hard about the problem.'

'A relationship between employees' mood states and their levels of creativity has been observed in organisational contexts.'

Intuition, insight and cognition: keeping ideas alive and kicking

The underlying cognitive mechanisms which are at work in the incubation phase are thought to involve divergent 'spreading activations' across diffuse networks of associations in long-term memory. During incubation neural activation is pre-conscious and pre-verbal up to the point at which illumination occurs, at which time it crosses the threshold into conscious awareness and the Eureka moment is experienced (Dorfman et al 1996).

If you didn't solve the 'cottage/Swiss/cake' word problem above immediately or by effortful thinking, your unconscious mind might by now have found the answer for you: the connecting word is 'cheese' (that is, 'cottage cheese', 'Swiss cheese' and 'cheesecake').

The concept of incubation and illumination doesn't only manifest in trivial word puzzles or the problem-solving habits of ancient Greek mathematicians; there are many examples of ideation in science and business innovation where the Eureka moment resulted in a major discovery or commercially viable business idea. For example, Edwin Land, the inventor of the Polaroid camera, had his Eureka moment while holidaying with his young daughter – she asked him the naïve but penetrating question of why they couldn't have their holiday snaps right away; for 3M's Art Fry, often credited as one of the inventors of the Post-It Note, it occurred in a Sunday church service – as the bookmarks in his hymn book fell to the floor he suddenly realised an application for the 'non-sticky' adhesive that he and his colleague Spencer Silver had invented; and

Clarence Birdseye of fish finger fame had his moment when he witnessed the flash-freezing of fish caught by Inuit fishermen in northern Canada – it provided a solution to the long-standing conundrum of how to freeze fish so that they had a 'just-caught quality'. All of these illuminative moments occurred when the inventors least expected it but had been working on the problem for many years (Sadler-Smith 2010).

Moods and the moment of inspiration: the importance of feeling and behaviour to insight and intuition

Mood also has a role to play in insight and ideation: in laboratory studies, it's been found that the induction of a positive mood state improves performance on insight problems by potentiating the spread of activation to weak or remote associations in long-term memory; this too facilitates divergent, as opposed to convergent, thinking (Bolte et al 2003). Conversely, a negative mood state promotes a more careful convergent processing, which may inhibit the creative and spontaneous processing required for ideation (Fiedler 2012). A relationship between employees' mood states and their levels of creativity has been observed in organisational contexts: for example, Teresa Amabile of Harvard Business School and colleagues found that *'positive affect [mood state] relates positively to creativity in organizations and the relationship is a simple linear one'* (Amabile et al 2005).

Based on the science of insight it's possible to offer some recommendations to support ideation in organisations (see Figure 3).

Figure 3: Ways of creating the conditions for ideation through insight

- 1 'Think without thinking'**

Insight involves the non-conscious processing of information; it's possible to 'think without thinking'; this can be an effective way to solve complex as well as simple problems.
- 2 Take a mental 'time-out' from the problem (that is, divert/switch your attention)**

Conditions for insight can be created by deliberately switching one's attention away from the problem, for example, taking a time-out, doing something completely different, or 'sleeping on it'; this allows unconscious thought free reign.
- 3 'Chance favours the prepared mind'**

Insight problems often involve 'joining the dots'; a level of expertise or mental preparation is often required, especially in the scientific, technical and business domains.
- 4 Be in the right mood**

Being in a positive mood state may support the divergent and spontaneous thinking required for creative problem-solving; don't try to solve problems that require a creative solution if you're in a negative mood state.
- 5 Expertise isn't sacrosanct**

'Cognitive inertia' is a potential downside of expertise; periodically challenge conventional, customary and comfortable ways of thinking by surfacing and sharing mental models.

3 The organisational learning context of intuition and insight

'Many leaders and managers testify to the fact that intuitions are indispensable when taking decisions in complex, uncertain and fast-paced environments.'

The deep business value of intuition and insight

Many leaders and managers testify to the fact that intuitions – sometimes referred to as 'gut instinct', 'gut feeling' or 'business instinct' – are indispensable when taking decisions in complex, uncertain and fast-paced environments. For example, the late Steve Jobs declared that we should each *'have the courage to follow [our own] heart and intuition. They somehow already know what [we] truly want to become. Everything else is secondary.'* Similarly Bill Gates, in a CNN interview, also revealed that he too *'trusted [his] gut instincts': 'If I think something's going to catch on I trust my own intuition ... it's often wrong, but my batting record is good enough that I keep swinging every time the ball is thrown.'*

Jobs and Gates aren't the first to acknowledge the value that intuition has in business decision-making – it's been long recognised as an important tool in any manager's 'mental toolkit'. As far back as 1938, Chester I. Barnard (1886–1961), an AT&T executive and author of one of the first important management books, *The Functions of the Executive*, championed the importance of intuition in managerial work. He described it as:

- a process which isn't capable of being expressed in words because it's unconscious and so complex and rapid that it can't be analysed by the person in whose brain it takes place

- a vague feeling that certain things are relevant and others are not, a 'feeling in our marrow' which is the outcome of previous experience that hasn't yet emerged into conscious thought, the very vagueness of which shields it from critical scrutiny (Sadler-Smith 2008, p43).

Barnard contrasted these 'non-logical processes' with 'logical mental processes', or conscious thinking, which is expressible in words and evident in the work of the 'exact scientist' but not so much in the high-pressure tasks which are important in managerial work. Barnard was in many ways ahead of his time. More recently the idea of two contrasting and complementary modes of thinking (which has a long history in psychology and philosophy stretching back to the nineteenth century and beyond) attracted the attention of psychologists and neuroscientists to the extent that the idea of *'two minds in one brain'* (Evans 2003) is now fundamental to a number of branches of the brain and behavioural sciences – and business and management research has recently caught on as well (Hodgkinson et al 2009).

Psychologists often refer to these two information processing systems as 'System 1' and 'System 2' (Evans 2008, Kahneman 2011, Lieberman 2007, Stanovich and West 2000). System 1 is evolutionarily the older of the two; it is automatic, intuitive, holistic, affective and unconscious; it is slow-learning/

fast-operating (for this reason it is also referred to as a reflexive system, or X-System). System 2 is evolutionarily the more recent; it is controlled, rational, analytic, affect-free and conscious; it is fast-learning/slow-operating (for this reason it is also referred to as a reflective system, or C-System).

The various attributes of these two systems, or 'two minds', are summarised in Figure 4.

On the basis of the two minds model (also known as 'dual-process theory'), intuitions can be defined as *'affectively-charged judgements that arise rapidly, involuntarily and non-consciously on the basis of holistic associations'* (Dane and Pratt 2007). The consensus amongst researchers is that intuitions are:

- **uninvited and instantaneous:** they're automatic, involuntary responses to complex, hard-to-quantify problems, decisions and dilemmas
- **affective:** they're accompanied by 'gut feelings' (affect) of varying levels of intensity which can signal 'approach' or 'avoid'
- **holistic:** they allow us to 'parallel-process' information quickly and efficiently and come to a judgement about the 'bigger picture'

- **non-conscious:** we're only aware of the outcomes of intuition, the lead-up is 'back-stage'
- **potentially powerful and perilous:** in the right hands, intuitions can be a powerful way to deal with complex problems and time-pressured situations, but in the wrong hands they can be ineffective and even dangerous.

But what is behind them? Intuitive judgements rely on the brain's capability to parallel-process multiple cues in complex decision-making situations and come to a rapid assessment of how to respond. This skill is based on learning and expertise and manifests as the ability to see patterns and trends that may simply be 'invisible' to others, especially novices.

Intuition, insight and working with expertise

For example, intuition researcher Gary Klein, in a study with the US Army on experienced fire-fighters' decision-making behaviours, predicted that fire-fighters wouldn't be comparing lots of options in emergency situations (there simply isn't time to do so), but instead they'd be comparing only two options at each decision point. Klein was surprised to find that even this prediction was wrong: experienced fire-fighters in most situations just came up with a

single course of action which they felt they could trust on the basis of their experience. Seeing a situation as typical (that is, matching a pattern), they could recognise typical ways to respond (that is, use a routine from their extensive repertoire). Their 'intuitive expertise' allowed them to:

- spot the important cues that the situation generates
- recognise patterns in the cues
- activate an 'action script' as a routine for responding to the situation
- take decisions quickly and decisively.

Nobel Laureate Herbert Simon (1916–2001) understood the limits of rationality and the analytical mind when he described intuitions as *'analyses frozen into habit'* and *'the capacity for rapid response through recognition'* (Simon 1987). In dual-processing terms, the fast-learning, slow-operating analytical mind builds over the longer term involuntary, fast-operating 'intuitive mind-ware' or complex domain-relevant schemas (CDRSs) composed of tens of thousands of 'chunks' of information. Research on expertise suggests that CDRSs are built up over a period of around ten years or so (Dane and Pratt 2007, Ericsson et al 2007) and enable experts to focus on key

Figure 4: The 'two minds' model

Analytical Mind	Intuitive Mind
<ul style="list-style-type: none"> • Narrow band-width • Effortful processing • Step-by-step analysis • Conscious • 'Talks' in the language of words • Recent/System 2 • Features in management education and training 	<ul style="list-style-type: none"> • Broad band-width • Automatic processing • Whole pattern recognition • Unconscious • 'Talks' in the language of feelings • Ancient/System 1 • Ignored in most management education and training

'As far as the stereotype of female intuition is concerned, there don't seem to be substantive differences between men and women in their use of intuition in general.'

aspects of a task, identify problem-relevant cues and 'sense' how to respond effectively. For example, in a study of novice (first-time) and experienced (repeat) entrepreneurs, the experienced entrepreneurs' CDRs were more clearly defined, richer in content and more concerned with factors and conditions related to actually starting and running a new venture (for example generation of positive cash flow) rather than with 'newness', 'uniqueness' and 'passion' which could lead easily to overconfident judgements (Baron and Ensley 2006).

It seems that experienced managers use intuition in at least five different ways (Isenberg 1984):

- 'sense' when a problem exists
- carry out well-learned behaviour patterns
- synthesise isolated bits of information into a bigger picture
- check the results of rational analysis
- bypass analysis to take a quick decision.

As might be expected, clear and consistent relationships have been found between intuition and job level and also job type: senior managers tend to make greater use of intuition than middle and junior managers; and, reassuringly, accountants have been found to be more analytical and less intuitive than, for example, actors or entrepreneurs (Hodgkinson and Sadler-Smith 2003, Groves et al 2008). As far as the stereotype of female intuition is concerned, there don't seem to be substantive differences between men and women in their use of intuition in general; however, it might be the case that women have a better developed social intuition (see below) (Myers 2004).

Insight and intuition tools and templates for practice

Neuroscience is beginning to add to our understandings of the biological bases of intuitive expertise. Herbert Simon's early research into rationality and intuition was based on chess experts, and a recent study of board game experts found two areas of brain activation which were specific to experts (the precuneus in the parietal lobe and the caudate nucleus of the basal ganglia – an important part of the brain's learning and memory system). The researchers suggested that there are specific brain circuits which are implicated in intuitive pattern perception and next-move generation amongst board game experts (Wan et al 2011). There's also an extensive body of research which indicates that the ventromedial region of the brain's frontal cortex (the VMPC) is responsible for infusing affect (that is, feelings) into what otherwise might be an overly cold and calculated process. Indeed, people who have incurred damage to this brain region through lesion or disease have analysis paralysis when it comes to taking even the most trivial of decisions (Bechara et al 2000, Damasio 1994).

Intuitive expertise is sometimes called 'expert intuition' or 'problem-solving intuition'. A number of researchers have argued recently that there isn't only one type of intuition (that is, there's more to it than 'expert intuition') and that there may be as many as four different types. For example, expert intuition is linked to decision-making and problem-solving, whereas social intuition can be linked to reading other people's motives and intentions and moral intuition to the gut feelings which serve as an internal 'moral compass'. The fourth type of intuition – creative intuition – is

linked to ideation and connects insight and intuition. Intuition is potentially powerful and perilous, therefore we must be wary of our own or other people's intuitions leading us astray (for example, as a result of wishful thinking, fears, biases, prejudices, confirmation

and hindsight biases, and so on). A sensible approach involves not ignoring intuitions completely or trusting them implicitly, but balancing the strengths of intuition and analysis in order to arrive at the best possible decision in the circumstances (see Figure 5).

Based on the science of intuition, it's possible to offer some recommendations to support decision-making and problem-solving in organisations (see Figure 6) (Sadler-Smith and Shefy 2004).

Figure 5: Balancing intuition and analysis in decision-making and problem-solving

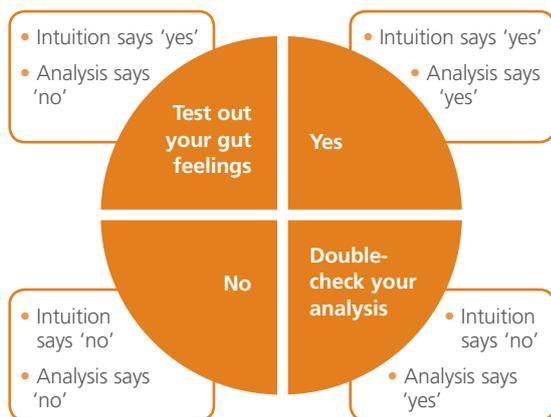


Figure 6: Using intuition to support decision-making and problem-solving

Open up the intuitive closet	To what extent do you: experience intuition; trust your feelings; count on intuitive judgements; suppress hunches; covertly rely upon gut feel?
Get a feel for your 'batting average'	Benchmark your intuitions; get a sense for how reliable your hunches are; ask yourself how your intuitive judgement might be improved.
Play 'devil's advocate'	Test out intuitive judgements; raise objections to them; generate counter-arguments; probe how robust gut feel is when challenged.
Elicit good feedback	Seek feedback on your intuitive judgements; build confidence in your gut feel; create a learning environment where you can develop better intuitive awareness.
Balance intuition and analysis	Be aware of the powers and the perils of intuition; watch out for wishful thinking, prejudices, fears and biases masquerading as intuitions; use intuition and analysis as a system of checks and balances.

Conclusion and practice pointers

Intuition and insight are critical aspects of management thinking. Yet because they often operate at the level of the unconscious and are often difficult to articulate, they receive less attention than they deserve. Both are critical to innovation and to business impact. The invention of new products, the generation of new ways of thinking, conceptualisation and business problems require the skills of intuition and insight. This report has shown how we can become more mindful and aware of these key skills by looking at:

- what intuition and insight are and how they contribute towards idea generation and problem-solving; in particular, how they help us to think of the process of change and ‘creative destruction and destabilisation’, helping us operate much more nimbly in an increasingly volatile, uncertain, complex and ambiguous world
 - their role in creative problem-solving and solution-seeking and how we can use processes of mental preparation, incubation, illumination and verification to test and refine ideas; thinking tools such as the RAT concept can help here
 - how the field of innovation has been researched and the scientific discoveries that pin down the neuroscientific and biological basis of this key skill
 - how mood and behaviour affect the use of both intuition and insight and how we can build the conditions which optimise both mood and moment – tools to help think about mood and opportunity are introduced and help to deliver a systematic perspective to the use of these skills
 - how business decision-making can be helped through better use of these skills and how we can tap into both the analytical and intuitive mind and make use of new discoveries around how we think and act in a business context
 - how as L&D specialists we can reflect on our own expertise and the expertise of others in developing our programmes, and how we can best manage knowledge and expertise within various settings
 - how practitioners can tap into various tools and templates, helping to reflect upon and release the energy of intuition and insight to drive real organisational impact.
- In using this resource and trying out some of the following practice pointers we hope L&D specialists will be able to drive a fresh understanding of the value of insight and intuition as a key part of organisational learning.
- When developing initiatives and interventions, be aware of the critical importance of thinking and perceiving skills in how ideas are generated and sustained.
 - Translate this into the practical insights around both innovation and continuous improvement as a way of developing an organisational learning imperative.
 - Use basic thinking and diagnostic tools such as RAT to test and expose the importance of innovation. Discuss how processes such as incubation and distraction can help build these skills.
 - Use popular examples of iconic insight-generators such as Einstein and Steve Jobs and figures such as Archimedes to explain how insight and intuition shape our world and propel organisations.
 - Use the more detailed tools outlined in this report to analyse and support the insight and intuition skills within the organisation and, if possible, seek to diffuse these through coaching and talent programmes, building continuous reflection and awareness.
 - Have fun with intuition and insight – use some of the many creative tools which are available to build energy and enthusiasm for these skills.

Dr John McGurk, CIPD

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¹ <http://www.guardian.co.uk/business/2013/mar/17/supermarkets-realise-size-no-longer-key-to-universe> [Accessed 23 March 2013].

² Arie de Geus, former Head of Group Planning at Shell, in 'How to Live for a Hundred Years' (BBC).

³ The Gestalt school of psychology (meaning the 'essence or shape of an entity as a whole') was founded in Germany in the early decades of the last century.

⁴ Business strategy researcher Richard Rumelt of UCLA's Anderson School of Management described the location and function of the aSTG as follows: 'Put your fingers on either side of your head about 1 inch above your ears. Under your fingers are your aSTGs, playing key roles in your ability to comprehend metaphor and analogy. There is an even further specialization between the two aSTGs: The right-side aSTG is specialized around recognizing more abstract and distant semantic associations.' <http://www.strategyland.com/2011/the-flash-of-insight/> [Accessed 25 March 2013].

⁵ <http://hbswk.hbs.edu/item/6872.html> [Accessed 25 March 2013].



Chartered Institute of Personnel and Development
151 The Broadway London SW19 1JQ UK
Tel: +44 (0)20 8612 6200 Fax: +44 (0)20 8612 6201
Email: cipd@cipd.co.uk Website: cipd.co.uk
Incorporated by Royal Charter Registered charity no.1079797