

## Developing Viable Competency

*Viable competency* describes a system of *skills* and *behaviours* that fit together *cohesively* to create a *coherent*, meaningful, *enaction* with the user's environment that can be *sustained* through the system's own self-maintaining mechanisms. They allow an individual or group to *anticipate* events and to *learn* and *adapt* to changing circumstances to maintain their professional ability.

The term 'viable' in this context is taken from Stafford Beer's Viable Systems Model<sup>1</sup>. Beer demonstrated that a *viable system* could maintain itself in balance with its environment through five key *components*. These were the *cohesion* of its *autonomous sub-systems*, the *coherence* of their *emergent properties* to achieve a *shared purpose*, the ability to *anticipate* and *adapt* to change and finally, to be able to *protect* the system from perturbations in the environment by the 'closure' of these sub-systems through a *recursive* implementation of their processes.

This article will explain the constituent *components* of *competency*, how they are developed and how they have to be maintained to create a *viable system* of professional conduct that has to be embedded in any organisation to sustain its existence.

### Competence and Competency – Skill and Behaviours

*Competence* and *competency* are used to identify the two sides of the skills equation. '*Competence*' refers to the acquisition of skills through explicit knowledge (*knowing-that*) while '*competency*<sup>2</sup>' refers to the development of *behaviours* through *tacit* and *implicit* knowledge<sup>3</sup> (*knowing-how*).

Most human choice is made by *intuition* and *emotion*<sup>4</sup>. However, since the days of Plato and Aristotle we have come to believe that our *rational thinking* is separate and superior to our *intuition*. There is steadily accumulating evidence, however, to show that the two evolved to work together<sup>5</sup>. Our intuition often functions as a *heuristic*<sup>6</sup>, making quick decisions based on simple evidence and past experience while our rational thinking evolved to explain, justify and communicate these decisions<sup>7</sup>. Humans are 'cognitive misers'<sup>8</sup>, sparing the use of rational thought wherever possible to address key issues. The development of any skill should therefore recognise the advantage in systematising low-level tasks as much as possible to the innate control of implicit behaviours – freeing the rational mind to think about the more serious problems and long-term strategies

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<sup>1</sup> Stafford Beer (1979) *The Heart of Enterprise*, Wiley, Chichester.

<sup>2</sup> The development of Competency Frameworks/Models was started by McClelland in 1973 with a view to moving away from traditional attempts to describe competence in terms of knowledge, skills and attitudes and to focus instead on the specific self-image, values, traits, and motive dispositions that are found to consistently distinguish outstanding from typical performance in a given job or role. More recent research by Goleman (Emotional Intelligence) and Boyatzis (The Competent Manager), have reinforced and emphasised the importance of competencies as essential predictors of outstanding performance. The development of Competency Models is now well developed (Lucia & Lepsinger).

<sup>3</sup> Nonaka, Ikujiro (2007) "The Knowledge-Creating Company" *Harvard Business Review*.

<sup>4</sup> Barrett, L. F. (2016). "The theory of constructed emotion: An active inference account of interoception and categorization". *Social Cognitive and Affective Neuroscience*.

<sup>5</sup> "Descartes' Error" by the neuroscientist Antonio Damasio describes how patients who had had damage to specific parts of the brain the ventromedial prefrontal cortex are unable to make decisions even though they could list the rights and wrongs. Damasio determined that gut feelings and bodily reactions are necessary to think rationally

<sup>6</sup> Not all emotions are *heuristics*, sadness, for instance, evokes rational thought.

<sup>7</sup> Margolis, H (1987) "Patterns, Thinking and Cognition", University of Chicago Press.

<sup>8</sup> Fiske, S.T., & Taylor, S.E. (1991). *Social cognition* (2nd ed.). New York: McGraw-Hill.

required<sup>9</sup>. Training is therefore a matter of blending these two cognitive processes to develop *thinking* (rational) and *behaviours* (intuition) together at the same time in a steadily evolving process.

This paper proposes that there are four *key components* to developing competency, namely; *education, underpinning knowledge, training and experience*. Each of these sub-systems can be recognised as a separate area of expertise. Together they make the *autonomous sub-systems* of our *viable system*.

*Education*, the first of these sub-systems, describes a *generalised area of study*, such as a use of a language, mathematics, or understanding of sciences.

*Underpinning knowledge* is the specialist knowledge that relates to the core understanding required for a skill. It is frequently a combination of several areas of academic educational study upon which is based the core knowledge for the skill; for instance, the specialist skill of navigation is based in an understanding of mathematics, astronomy and physics. The subjects and level of *education* required to take on the *underpinning knowledge* (UPK) have to be *cohesive*;

*...for instance; it is no good turning up at aircraft design school with a degree in English Literature and a deep understanding of Shakespeare!*

At this point *education* and *underpinning knowledge* can be seen as *explicit knowledge* i.e. '*knowing-that*'.

Once *underpinning knowledge* has been acquired *supervised training* under instruction is required to learn how to apply this knowledge practically. This has to teach an individual to recognise and respond to the likely situations they will encounter that the organisation has learnt, however, because *instinct* makes up so much of our decision-making processes much of this is *tacit knowledge*, that is '*knowing-how*', which can only be gained through 'doing'. This learning requires building behaviour by repeating processes until they are instinctive.

*...You cannot learn to drive a car from a book!*

This training must develop the necessary *competency behaviours* and *enact sensemaking*<sup>10</sup> that allow an individual to cope with most circumstances that they will encounter<sup>11</sup>.

Developing *competency behaviours* is not just about creating *instinctive action* but a fundamental part of creating understanding and meaning for the subject – this is the meaning of *sensemaking*.

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<sup>9</sup> Barsalou, L.W. (2016). Can cognition be reduced to action? Processes that mediate stimuli and responses make human action possible. In A. K. Engel, K. J. Friston, & D. Kragic (Eds.), *Where's the action? The pragmatic turn in cognitive science* (Strüngmann Forum Reports, Vol. 18, pp. 81-96, J. Lupp, Series Ed.). Cambridge, MA: MIT Press.

<sup>10</sup> Varela, F. J., Thompson, E., & Rosch, E. (1991). *The embodied mind: Cognitive science and human experience*. Cambridge, MA: MIT Press.

<sup>11</sup> Ideally the number of different states of the environment, known as its 'variety' should be matched by the behaviours available to the individuals, this is the Law of Requisite Variety (W. R. Ashby). However, it is important to recognise that rarely can an individual be trained to cope with all the different states that a system may be in.

From the Embodied Mind;

*“... cognitive structures emerge from the recurrent sensorimotor patterns that enable action to be perceptually guided.”<sup>12</sup>*

*“Exchanges with the world are inherently significant for the cogniser and this is a definitional property of a cognitive system: the creation and appreciation of meaning or sense-making in short.”<sup>13</sup>*

Only when they can manage in the environment, that they will normally be expected to operate in, should they start to gain *unsupervised experience*. This point of ‘going solo’ is achieved when an individual can exhibit *Level 1 Learning*<sup>14</sup>, that is, they have developed sufficient *implicit* knowledge to be able to automatically adjust their *behaviours* to cope with the circumstances they encounter. *Implicit* knowledge is a store of personal experience that cannot be acquired any other way but by ‘doing’ and builds instinctive processes and decisions.

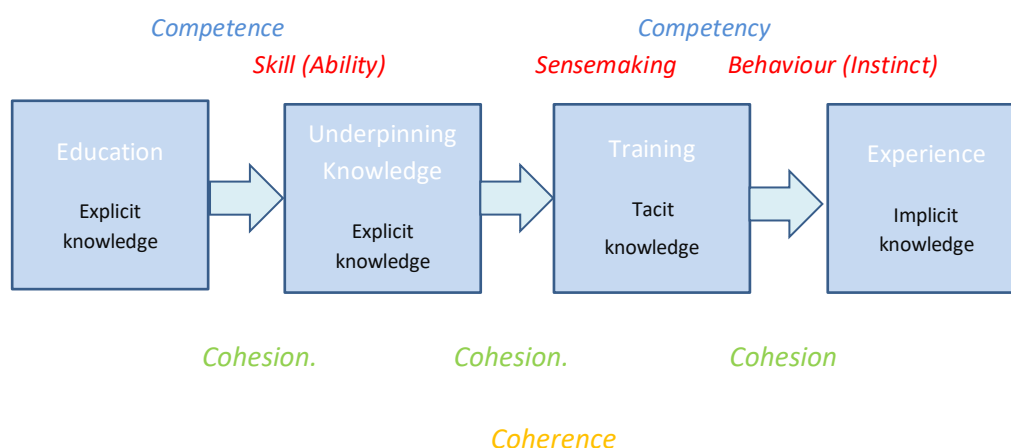
*...You start to change gear without thinking about it!*<sup>15</sup>

Each of these processes of learning must have *cohesion* with the others, one could simply say that the *education* must be appropriate for the *underpinning knowledge* which must be appropriate for the *training* which must be appropriate for undertaking the task. In addition, they must all make sense, and have *coherence* with the ultimate aims of the task at hand.

*...It is no good if the education, underpinning knowledge and training do not equip you to do the job!*

see diagram below;

Fig 1 – The Coherence of Competency



<sup>12</sup> *Op Cit* Varela, F. J., Thompson, E., & Rosch, E. (1991).

<sup>13</sup> *Ibid*

<sup>14</sup> Bateson (1964) *The Logical Categories of Learning and Communication*

<sup>15</sup> Described as ‘Hebbian Learning’. The more a neural pathway is used the faster the neurons will fire – sometimes expressed as “neurons that are wired together fire together!”

Achieving an *educational standard* and taking on the *underpinning knowledge* is a measure of someone's 'ability' to acquire *explicit* knowledge and hence develop *competence*. Achieving levels of *competency* through *training* and *experience* is a measure of an individual's *behavioural instincts*. Ultimately a competent person is somebody who has the ability and behaviours to;

*"know what he is looking for, recognise it when he sees it, and knows what to do about it"*

Competency is a System of Systems.

Without wishing to complicate this description it is useful to understand the *levels of learning* that are involved in this process. Once someone has developed *sensemaking* and *competency behaviours* to be able to act without instruction they have achieved Level 1 Learning – that is;

*The ability to make gradual, incremental change that involves making corrections and adaptations through behavioural flexibility. These changes are still, however, "within the box"-e.g., establishing and refining new procedures and capabilities.*

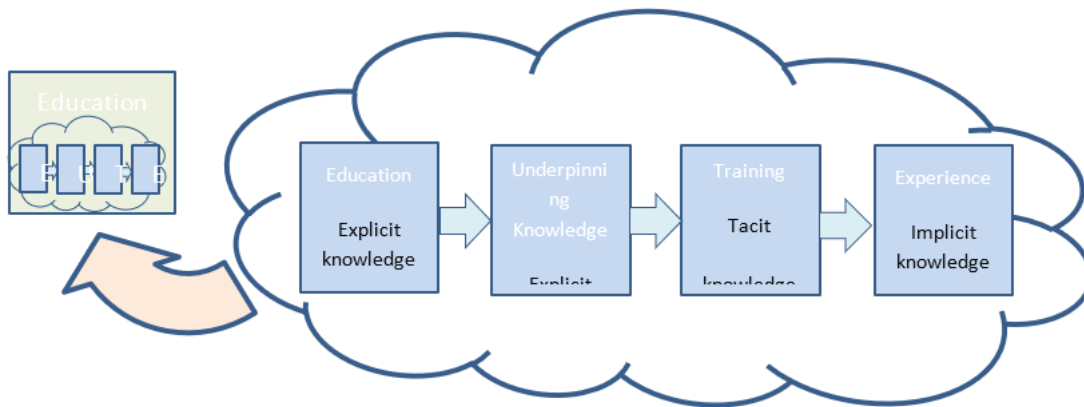
In other words, they can respond to what they experience in their known environment. It is when they encounter experience outside their known environment that they need to access Level 2 learning, which Bateson described as Deutero Learning;

*The instantaneous shift of a response to an entirely different category or class of behaviour. It is essentially the switch from one type of "box" to another-e.g., change in policies, values or priorities.*

So a person with Level 1 learning will be able to change their behaviours based on their training, however, a person, or organisation, with *Deutero Learning* will be able to re-evaluate their *underpinning knowledge* based on their *experience* and re-train their *behaviours* for a new state of the environment – This is *adaptation* and it is a critical stage in the development and maintenance of a *viable system* because it allows the system of training to extend its behaviours to match the number of states of the environment and maintain *requisite variety*.

A further complication is that the processes of the key components are not linear. The whole process is also *recursive*, that is it is embedded within itself. It is this mechanism that allows the system to achieve *stability* and become *self-organising* and also to create its identity and purposefulness. So, to explain with an example, the *education* required for any *competence* *itself* requires processes of *knowledge*, *training* and *experience*; similarly, the acquisition of *knowledge* and *training* also requires processes of *education*, *knowledge*, *training* and *experience*, see diagram below.

Fig 2 – The Recursion of Competency



Competency is also *multi-layered* with *skills* and *behaviours* required at different levels; in two different ways. Firstly, it is layered in terms of complexity – think GCSEs, A Levels and Degrees all on the same subject, this creates a second level of recursion, not only horizontally where the key *components* are embedded in each other but also vertically in the different levels. And secondly, it is also layered in different subject matters; think systems operator, system supervisor, system manager, system director. While the skills and behaviours for the former build on themselves the skills and behaviours for the latter may not, for instance, being a system operator may require patience and concentration while to be a system manager may require interpersonal skills. Overall, **therefore, any system of competence and competency is a system of systems, with embedded and recursive relationships;** see diagram below.

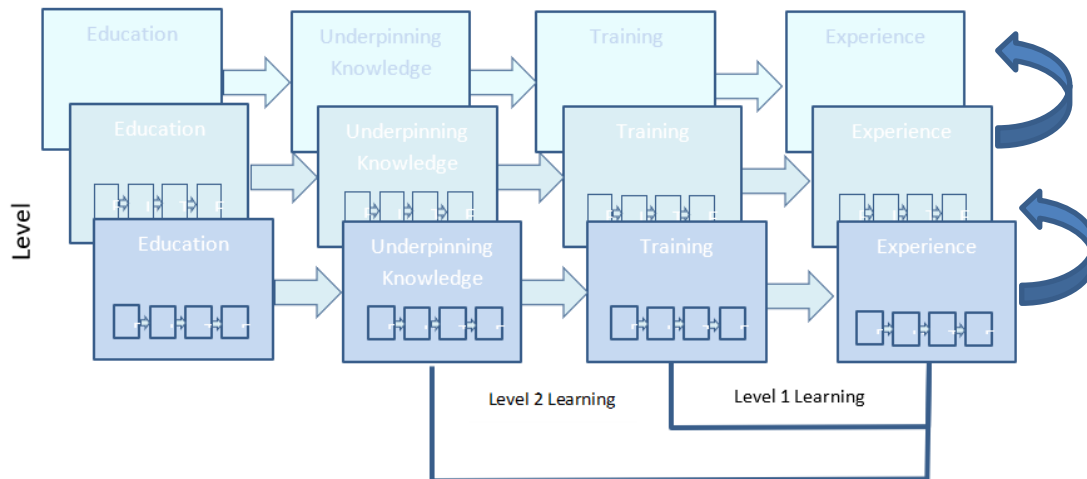
#### Self-Awareness

The recursion of systems within systems is not just an embedding of processes within other processes, it is also the very means by which the system as a whole becomes self-aware. The distinction a system makes between itself and its environment, in other words its self-identity, can be re-entered into the system at each level of recursion to create a “second-order-question” of the systems activities. This is essentially the system asking itself for everything it does “why or how it is doing what it does” in relation to its identity distinction. In other words, it says “why am I doing this activity like this if I am this type of organisation”. It questions its own activities and in doing so becomes self-aware. This is a very necessary function for the organisation to be able to learn.

#### Instruction

While for many areas the levels of the *competency behaviours* may match the hierarchies found in the organisation; supervisor, manager, director etc, this will not always be the case, especially when we look at the processes of *instruction*.

**Fig 3 A System of Systems with Embedded and Recursive Relationships**



When we look solely at the development and training of competency the stage above any *practitioner* level has to be that of *instructor*. Instructing a *competency* is very different from the skills in the recursive layers that sit above it in its management layer. Instruction requires a different set of *education*, *underpinning knowledge*, *training* and *experience* from management. Instruction requires an *underpinning knowledge* of how *people learn*, and a practical understanding of “how to instruct” e.g. when to interfere, when to correct, what is safe or when to let the subject learn for themselves. It also requires experience and assessment as an instructor by an ‘instructor of instructors.’ The *learning hierarchy* of any organisation must therefore be embedded in the organisation if the system is to remain viable and it cannot always be combined with the management structure but may have to be a separate entity.

Take for example the case of unarmed combat in the US Marine Corps;

*For years the head of unarmed combat struggled with trying to make headway against cuts to his training programme; finally, in exasperation, he went to the General “I am wasting my time” he said, “ how do you expect me to train somebody in two weeks Basic Training, when martial arts take a lifetime of practice and study”. The General thought for a moment and then said “well that’s what we will do then!” and he instigated a programme that embodied unarmed combat training into the daily life and the career of the Marines. In one simple move he ordered that every Marine would wear his martial art grade as the colour of his normal uniform belt. To achieve grades a Marine would have to practice regularly and to do this the trainers would have to be embedded throughout the Corps<sup>16</sup>.*

Building the training and instruction into the culture of an organisation is the only way to make an *ultrastable self-organising viable system* that will maintain itself.

### Developing Competency Through Enaction

It would seem logical to apply the steps given in the previous section in linear order i.e. *education*, *underpinning knowledge*, *training* and *experience*, however, appreciating that this is a recursive

<sup>16</sup> [https://en.wikipedia.org/wiki/Marine\\_Corps\\_Martial\\_Arts\\_Program](https://en.wikipedia.org/wiki/Marine_Corps_Martial_Arts_Program)

system of feedback means that there is no real starting point. It is necessary to start at all points at once! How on earth is this to be done?

The '*circles of knowledge and action*' that we have in the diagrams above

Contrary to the normal 'top down' method of planning where rational logic is used to develop a plan, with *competency behaviours* the process is reversed. To create a competency framework or model a study is taken to find the most effective behaviours by interviewing and consulting experienced personnel to identify 'what they do that works.' Once these have been identified it is necessary to start with the most basic behaviours that automatically assume a level of education and underpinning knowledge and work up the system. Because context is very important to the formation of memory it makes sense to undertake training in situ – developing behaviours in a strong professional culture and explaining the reasoning and underpinning knowledge as the skills are acquired helps develop all components simultaneously. Developing the most basic behaviours and instincts at the same time as *understanding*; creating intuition that frees up the cognitive processes for the next level of learning. This is not only how people learn – through interaction with the environment in a process known as *enaction*<sup>17</sup>, but also how individuals codevelop with their environment. For this reason, if no other, most training must be embedded in the day-to-day function of the organisation. As the organisation adapts to the environment – so too must the development of its competency training; people are, after all, training to work with the current environment, not some past representation of it.

Where does the development of competency sit in an organisation's viability? Is it a part of the system of coordination or does it stand alone as an autonomous sub-system? The learning levels of individuals must be linked to the learning of the organisation.

Competency development is both an autonomous sub-system (System 1) and a coordinating function (System 2), depending on its outlook. Specialist competency that provides skills to maintain a particular output is a sub-system of that sub-system, however, competency that assists the purposefulness of all the sub-systems is part of the coordinating function that maintains cohesiveness.

Learning lies in the steady development of any process. It is in the feedback of the homeostat of a viable system connected both to the environment and within the organisation itself. However, organisations do not stand still. And as homeostats find stability in different states so personnel will have to adapt and deliver new behaviours. This is easy if they already have these skills but if they do not a viable organisation has to anticipate and develop them. This is a key aspect of viability – developing competency takes time and anticipating new behaviours takes good judgement – this aspect of competency development therefore belongs in the meta-system at every level of recursion. System 4 in anticipation and System 3 in creating a coherent structure of training.

This is therefore a key aspect in change management – how can an organisation develop the key competency behaviours and feedback when it hasn't yet started the new system.

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<sup>17</sup> *Op Cit* Varela, F. J., Thompson, E., & Rosch, E. (1991).