

# How can we understand intentional movements that make up sport? Rationality or mind - body connection and intuition?

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## Abstract

How can we understand intentional movements that make up sport? The convenient truths often come from an information-processing theory based on a computer model of the mind. The computer model of the mind has been widely adopted for sport research at conceptual, empirical, and practical levels, and it has led to a reliance on notions as information processing, motor programs, representations, traces, schemas, video analyses, and the like. In this paper I will show that development of elite sports results is more than biomechanics and computer models of the mind – it must also incorporate the athlete's own mind body connection and intuition. The conclusions of my research challenge existing beliefs, assumptions and approaches to best practice.

## 1 Introduction

How can we understand intentional movements that make up sport? The convenient truths often come from an information-processing theory based on a computer model of the mind. The computer model of the mind has been widely adopted for sport research at conceptual, empirical, and practical levels, and it has led to a reliance on such notions as information processing, motor programs, representations, traces, schemas, video analyses, and the like. This is an analytical approach often used in the study of sport technique. The preeminent discipline is biomechanics, the science that examines the internal and external forces acting on a human body and the effects produced by these forces.

Technique training in sport is broken down into muscle movements, individually-identified forces, angles and degrees expressed in precise mathematical terms. The use of “recipes” and precise instructions, based, for instance, on the minutiae of video analysis, are intended to lead consistently towards perfecting movement patterns. This is often combined with medical measurements and tests intended to find the “correct” intensity and duration of training (Duesund 1999, Loland 1992, 2000, Fusche Moe 2005). In this paper I intent to examine a rather different approach to performance development in sport. On the basis of a theoretical and empirical discussion I will demonstrate that the “good performance” can be based as much on the athlete's feelings, intuition and connection between body and mind.

## 2 Two different views of performance development

### 2.1 Knowledge and performance

Against this background, we can detect two different ways of explaining the development of knowledge and performance. If knowledge development can be understood as “output” in the form of improving ability (Lai 2004, p. 155) we can examine the relationships between a number of factors such as the individual athlete, trainers, leaders, training principles, manuals, pulseometers, equipment and medical measurements.

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I have chosen to give all these potentially-significant factors the generic name “elements in the learning network” (Gotvassli 2005).

The relationship between these elements can be viewed from two different perspectives. One view is that the learning network contains certain elements which must be given hierarchical priority ahead of other elements. Relationships between these elements are firmly fixed; for instance the trainer’s programmes and scientific measurements must be followed ahead of the athlete’s feelings. Another view is to regard the relationship between the various elements in the learning network as shifting and negotiable, precisely in order to constantly optimise the development of skills and performance. A productive sense of wonder is created around the dividing line between physical measurement and intuition, between the trainer’s planned schedule and the athlete’s opinions, between standardised training programmes and the athlete’s local requirements. In such a framework, physical measurements of, for instance, pulse and lactate, can be used by the trainer to create a wondering, reflection and dialogue with the athlete. Should training be intensified or should the planned programme be adjusted? Against this background, this article presents a theoretical framework containing different forms of knowledge development – the rational Knowledge Management direction, learning as socio-cultural activity and knowledge development through intuition, discernment, emotion and “mind-body” connections. These theoretical postulations will subsequently be explored and criticised through case studies / examples from sport, cooking and other groups requiring highly-exacting performance. The primary question I wish to examine is therefore: *what is the significance of intuition, discernment and feelings for learning and performance development?*

## **2.2 Theoretical perspectives – two primary views**

That learning and knowledge development in organisations is a many-sided and complex field, involving input from many disciplines, is made clear by sitting down and perusing the *Handbook of Organizational Learning and Knowledge* (Dierkes, Antal, Child and Nonaka 2000); in all 1000 compact pages. It is self-evident that it is difficult to find a single approach to or understanding of these issues that is universal and universally accepted. The literature on this area can nevertheless be divided into two groups. The first takes as its starting point an understanding of knowledge in a structuralist perspective. Knowledge is something that individuals and organisations possess in a concrete way, and it can be identified, treated and disseminated. This type of understanding is often based on models from individual psychology and cognitivism. The focus of the other group is that knowledge and knowledge development is primarily based on different types of processes in organisations, in particular socio-cultural processes which occur in action and in practice. The idea is that knowledge development in organisations is not to be understood purely as a mental process carried out by individuals. Quite the reverse, it should be understood as a social expertise; in other words, knowledge in a practical context will be situated in a historic, social and cultural context, where it is both created and built into different forms and media. Newell, Robertson, Scarbrough and Swan (2002, p. 8) summarise this in the following table:



Structural perspective	Processual perspective
Knowledge is a discrete cognitive entity that people and organizations possess	Knowledge is rooted in practice, action and social relationships
Knowledge is objective and static	Knowledge is dynamic – the process of knowing is as important as knowledge
Knowledge exists at the individual and collective level	Knowledge exists through the interplay between the individual and the collective level
Different types of knowledge dominate in particular types of organization	Organizations will be characterized by different types of knowledge and practices of knowing
Knowledge is created via specific social processes	Knowing occurs via social processes

**Table 1”The structural and processual perspective”**

### **2.3 The structural perspective – Knowledge Management**

Over a period, concepts and methods from biology, individual psychology, economic theory, decision theory, cybernetics and education have to a great extent been employed at organisational level (Morey, Maybury and Thuraisingham 2002, Dierkes, Antal, Child and Nonaka 2003). This branch of thinking has been given the label Knowledge Management (Styhre 2003). This discipline has also been instrumental in launching the use of information technology as an important agent in mapping, classifying and distributing knowledge. This understanding springs from the dominant epistemological position in western culture – that of rational understanding. Knowledge is first and foremost something that is acquired and owned by individuals (Brubacher 1966, p. 98 – 134). Knowledge can be identified and subsequently used to analyse a practical situation and possibly shape action. It is through rational and analytical thought and use of our intelligence that we can minimise the destructive effect of our senses and subjective impressions, and thus acquire the best possible knowledge of the world. In this context, theory is more important than practice; the mind more important than the body.

This division between theory and practice, between subject (the knower) and object (the known) and between thought and action has long roots in history (Nicolini, Gherardi and Yanow 2003, p. 5 – 7).

Much of the background for principles of Knowledge Management can be found in the behaviouralistic tradition dating from Simon (1947), though the traditions of Cyert and March, and up to the more change-orientated models of the 70s and 80s, in which the problem consisted in finding out how organisations learn in a turbulent environment; the latter particularly in the work of Cohen & March and March & Olsen (March, 1995). The core of their argument is that we can understand organisations as a kind of institutionalised brain. In this way, the decision process can be broken up and made routine. As Morgan (1991, p.85) expresses it: "Organisations are information systems. They are communication systems. And they are decision-making systems".

The development of so-called 'expert systems', based on the intensive use of information technology, should be seen in this context. This has been one of the strongest driving forces in the Knowledge Management tradition. An example of such thinking is the use of pulseometers and other measuring equipment that can give precise information about the state of a body. The thought is that the new technology can offer precise measurements, far better than the individual in question could come up with by interpreting available information.



In relation to my enquiry about the significance of the various elements in the learning network, it is not difficult to see that the Knowledge Management tradition points towards expert systems and measurements being ranked higher than the athlete's own feelings and understanding.

## **2. 4 Situated action theory and socio-cultural understanding**

It must be said that Dewey (Østerud and Wiig 2000, p. 2) was the first to formulate a view of knowledge development and learning that later came to be termed situated action theory, situated activity or situated cognition, as formulated by Greno (1989) and Lave and Wenger (1991). We encounter terms such as *situated cognition* (Greeno 1998, Clancey 1997), *situated action* (Mantovani 1996), *distributed cognition* (Hutchins 1995), *learning as legitimate peripheral cognition* (Lave og Wenger 1991), *mediated action* (Wertsch 1998), *Cultural psychology* (Cole 1990, 1996), *activity theory* (Engestrøm 1987, Engestrøm and Miettinen 1999), *reflection-in-action and knowing- in- action* (Schön 1983/2001), *implicit knowledge* (Polanyi 1958, 1966, 1969), *implicit experience* (Öquist 1994) and *Communities of Practice* (Brown and Duguid 1997).

Common for all these is an understanding of learning as a set of activities that are woven into a complex social and cultural context. Underpinning the *Communities of Practice* tradition is a clear socio-cultural understanding (Wenger 1998).

*Communities of Practice* are the very building blocks of social learning systems, and it is here that skills are developed and stored. These social systems have characteristics such as group initiative, reciprocal engagement, and a common repertoire of actions, objects, terms, history and discussions. Practice communities of this sort grow up as a result of interaction between skills and personal experience in an environment of group engagement in a common expression of practice. A knowledge development of this sort will be dynamic in the extreme because it has been negotiated in the interaction that occurs in the social practice situation. This approach also addresses the process of the transition from being a beginner-member of this practice community to developing into a fully-fledged member with expertise. *Legimate perhipheral participation* (LLP) is the term applied to this process which involves the progressive involvement of newcomers into the practice community where they gradually develop a higher competence.

Central to a socio-cultural understanding is that knowledge is woven into action and is associated with specific situations. Actions are concrete and contextual. Knowledge lies in the carrying out of the action so that the job will be done in a satisfactory manner.

## **3 A third way – the significance of intuition, feelings and aesthetics**

### **3. 1 Introduction**

The first two approaches I have presented emphasise respectively individual abilities and the acquisition of knowledge through systems and procedures, and the acquisition of knowledge through participation in the practice community. I now wish to present a third way – knowledge development through reflection, feelings, intuition and aesthetics (Elkjær 2004). A good command of the practice situation, in terms of carrying out tasks, requires social processes which give opportunity for interpretation and self expression on the part of the individual. In traditional leaning theory, such as in a structural understanding, art and knowledge are regarded as opposite influences. Duesund (1995, p. 114) demonstrates how art is associated with intuition, sensitivity, the soul, inspiration, discernment, subjectivity and the like. Knowledge, however, is associated with sense, rationality, precision, exactness and objectivity.



The term art can also denote a fully-developed ability, and the results of such an ability. We use terms like “a masterpiece of a goal”, “a beautiful ski jump” and “an artistic series of dribbles”. Thus art has its rationality and knowledge its intuition. Both art and knowledge spring from the living body and cover areas of ability which are interlocking rather than mutually exclusive. In relation to movement in sport, actions will also develop knowledge. Abilities develop and improve because a dynamic and creative element is present in action and movement. In this way, action expresses and creates new knowledge.

### **3.2 The belittling of body and feelings in theories of learning**

Feelings, experiences and intuition have traditionally been given little room and low status in organisational research. The pre-eminent understanding has been the objective, dualistic body. The philosopher René Descartes (1596 - 1650) is considered to be the most significant influence on the development of the dualistic understanding of the body which has dominated in our culture right up to the present day (Duesund 1995). In the term “dualistic” lies the concept of a division between body and soul, body and surroundings (Råheim, 2001). To the extent that feelings have been mentioned at all, they have been regarded as disturbing rational decisions (Lord *et al* 2002, Fineman 2002 and Scherer & Tran 2003).

#### *Rooted in body phenomenology – the living body*

As already observed, theories of learning pay little or no attention to the body as an important feature of learning and performance improvement. As a counterbalance to understanding the body as an object, the philosopher Maurice Merleau-Ponty has adopted the term “the living body”. He alleges that “we are our body” and “the body is the person”. There is no division between body and soul; there is a “bodily soul and a spiritual body”, or, put another way, “an incarnate body” (Duesund 1995, Råheim 2001, Loland 2003, Macann 2002 and Merleau-Ponty 2004). On this basis the body cannot be regarded as an object. Merleau-Ponty regards the body as a centre of sensory perception, experiencing, experience and recognition. Merleau-Ponty regards the body as man’s way of being in the world. In other words, the body is existential. He says that: “feelings exist within the body, in the face and gestures; they are not behind the body, such that the psyche has to express itself through it”. The body is also relational in the sense that it is the basis for our relationship with other people.

Merleau-Ponty speaks of the body’s duality. We simultaneously *are* our body and *possess* our body. When we touch an object, we also touch ourselves. He understands the simplest touch as a self reflection. “The living body” is a “phenomenal body” in the sense that theories are phenomenological, developed within phenomenology, the philosophy of appearance.

#### *The reflective practitioner*

An important piece of work pointing the same way is Donald Schön’s work on the reflective practitioner (Schön 1992/2001 – Danish edition). He powerfully contradicts the prevalent technical, rational framework of understanding and launches an epistemology of practice which lies implicit in the artistic, intuitive processes that many practitioners use in situations involving uncertainty, instability, unique circumstances or conflicts of interest. Schön draws on such authors as Barnard (1938), Ryle (1949) and Polanyi (1967) in introducing the terms knowledge in action and reflection in action. He regards every-day life as shot through with intuitive, spontaneous actions, in which knowledge is mostly implicit, integrated into the action. This means that we often can find it difficult to explain what we know and why we act as we do. On the other hand, knowledge can become conscious and changed when the practitioner encounters a situation in which intuitive action comes to a stop, probably as a result of unexpected and surprising events.





This results in reflective action, a reflection in practice. Research within this tradition shows how artefacts and interactions can bring out both opinion and knowledge in practice without necessarily involving representations such as pictures, drawings, recipes, etc. (Yanow 2003).

#### *The significance of intuition, feelings and body in the learning network*

From my standpoint it will be interesting to see to what extent these conditions will be relevant to performing athletic skills. What is the role of the athlete's own feelings and intuition? To what extent does "the body as subject" form a basis of performance improvement? Not least, to what extent can these elements in the learning network be ranked or attributed significance to in relation to other, objectively measured, elements such as tests, manuals, training programmes, instructions and physical measurements. My examination of the themes of knowledge development, feelings, body and materials show that knowledge is primarily regarded as the result of cognitive and/or social processes. The literature thus displays a form of *somatophobia* – a fear of confusing body, feelings and abilities. An approach of this sort risks overseeing important facets of knowledge development as it occurs in practice. On the other hand, body phenomenology, with its view that we are our bodies, offers an important framework for understanding these conditions.

## **4 Empirical data**

### **4.1 Into practice**

In what follows I will present some empirical data drawn from my doctoral dissertation (Gotvassli 2005) and follow up studies. I will also draw in findings from other research and finally compare this with the theoretical framework hitherto presented. Much of the fieldwork consisted of participatory observation with athletes in a training situation. I have spent two more substantial periods in field work, amounting to about 3-4 weeks in all. The longer periods of field work were spent with a group of skiers and an athletics group. The practitioners, some of whom were young, were operating both at national and international level. These field-work periods have also naturally involved the collaborations of leaders/trainers. At these meetings there has been opportunity to observe other practitioners in their practice situation.

My participation in these meetings has been relatively "close up" in that I have lived together with the athletes, eaten with them and participated in the training in the field. That I was sufficiently fit to partially join in the less demanding sessions was probably an important factor in being brought "into the warm" and accepted as a participant even though I was initially very clear about my role and gave a brief description of my project.

### **4.2 A snapshot**

It is 12 January 2004. I have now been at the training area of Stellenbosch stadium for two days and there has been a great deal of activity from runners, jumpers and throwers. Today I have decided to look a little closer at the training work of one of Norway's best javelin throwers. During the training in South Africa he is being advised by the specially-engaged trainer Jan Pospisil, who was responsible for over 10 years for the Czech javelin thrower Jan Zelezny. I immediately observe a trainer who is very close in to the athlete and intense in his work. Much of the training work is concerned with practice and development of technique. There is plenty of comment on the whole throwing movement, footwork, arm position and the angle of the javelin. Typical remarks include: "*You must feel the whole movement, you must coordinate the whole body, you must feel the javelin in the hand...*".



With the help of representative sounds, Pospisil attempts to bring out movement patterns: “*You must run ba-ba-ba, not baa --- baa --- baa...*”. Other typical remarks are: “*Make your own mental images of the movements, relax, relax, make lazy movements, you must concentrate and feel the body in the movements...*”

In conversation with me after the training session (much of the same is reinforced after a training session the following day) Pospisil is very clear that technique training is a long and difficult process in which it is important to involve the athlete himself and get him to use the whole of his range of senses. He speaks passionately about how important it is to think of the javelin as an integral part of the movement system. All parts: feet, arms, indeed the whole body and the javelin itself must be coordinated up towards an optimal joint pattern of movement. Pospisil constantly emphasises that “*learning is about making good feelings and the person himself must train to listen to the whole movement ... it's like a complicated feedback system*”.

#### **4. 3 Flow and the good feeling**

After being out in the field and observing and interviewing a series of athletes and trainers, it is easy to confirm that a number of terms are heard again and again when athletes are describing a successful training session or good competition effort. The athletes themselves use terms such as: “*when it flows*”, “*found a good rhythm*”, “*found the good feeling*”, “*felt that the body worked properly*”, “*listened to the body*”, “*found a good propulsion*”, “*felt that both rhythm, speed and glide were well coordinated with the terrain*”, “*felt that the throw set*”, “*had good contact with the pole*”. We can see here that the language used to describe the situation is mainly verbal and emotional, and not complicated and physiological. This is how it is expressed by the athlete’s own “tuning fork”, which is the most important indicator as to whether it functions or not. No-one describes this in terms of exact muscle movements, enzyme production and so on, which would be possible by using theoretical explanations of what is occurring. These terms (flowing, the throw ‘sat’, good rhythm, etc), which are essentially vague and imprecise, are understood and experienced as relatively precise expressions by those who are used to this particular *genre*. As Cook & Brown (2002, p. 86) observe, this is a part of the implicit knowledge of this group. Meaning and understanding within such *genre* are in constant development and subject to a constant negotiation in practice as they are used in the group’s practical work.

Let me describe a more complete training situation in order to make this point. Six skiers are to undertake so-called distance training. This is training of relatively high intensity for about 20-30 minutes. The route chosen for today’s training is a demanding one, which climbs constantly along the off-piste route in Scladming. The route, incidentally, is at an altitude of about 4000 feet. Before the training session, the trainer gives relatively detailed instructions that the pulse should remain at about 20 beats under the maximum pulse (i.e. about 180-190 beats per minute) and that lactate measurements will be taken straight after the session to check that the intensity was correct. In addition to setting a number of precise, technical demands for the training session (such as the pulse rate) the trainer is also concerned to deliver a message about the purely emotional aspects of the training:

“It is important to find the rhythm early, do not stress, but get flow in the movement and think good movements. Use “elghufs” [a term for a type of movement – a moose way of running] where it is steepest and let your body follow the terrain. This is training for which it is important to find the correct level of intensity”.



Immediately after the end of the training, measurements were taken of the lactate level of all participants and pulseometers were read. Pulseometers indicate both average pulse level and variations along the way. It is also the case that pulseometers can be set to sound a warning if a pre-set pulse level is exceeded. With some small variation it appears that most people have hit the correct level of intensity. There is lively discussion of the training between the athletes and between trainer and athlete. Much of the discussion is based on explicit, measured values, but it soon turns to more emotional sides of the training. One of those who has met well the requirements in respect of pulse and lactate expresses himself as follows:

“It was terribly steep so I had to think rhythm and flow the whole time to prevent the pulse from becoming too high. If you stress and worry in such training you stiffen up like a stick and have milk acids coming out of your ears before you’re half way round. I felt that my pulse was a bit high in places, and the measurements also show this, but I was quick to regulate it so that there was better balance in the run”.

#### **4.4 Emphasis on emotional elements**

In the post-training discussion it also emerges that the ability to “hit” a correct level of intensity seems to be somewhat differently developed amongst the athletes. There is also a varying degree of correlation between their own experiences of intensity level and those shown by the actual measurements. It also appears that when athletes and trainers are planning to carry out a training session, emotional elements are awarded a strong influence.

Knowledge of what constitutes good training is derived primarily on the spot from the athlete’s emotional register in a complicated feedback system consisting of contact with the ground, breathing, movements, etc. These are experienced as a totality, not as separate elements that can be isolated from each other. The actions are experienced as an even stream of activity and as a perception of a total situation. To use terms that I have previously introduced, the body’s movements are experienced rather than paying attention to what movements the body makes. One is in the situation, not away from it. One of the athletes remarks that this time the body cooperated and did not resist – in other words the movements were being experienced from the body; the individual was not directly aware of the body. The latter situation is often a result of coming out of rhythm, of the body being stiff or of some sort of injury such as a pull in the leg.

#### **4.5 The significance of physical measurements**

Instruments and physically exact standards and measurements were however brought in beforehand to create a framework round the training and to provide some data to form the basis of discussions afterwards. For instance, a lactate reading of 5.1 after the training session can work as a catalyst for a discussion of the training session. Trainers I have observed have also used this kind of data to get the athletes themselves to reflect on their own training and did not use the data as firm evidence of how successful or unsuccessful the training session was. We see here that exact data from instruments is not ranked higher in the hierarchy than other elements in the learning network. The significance of measurements is brought into a discussion in the form of a negotiation on what they mean in relation to other elements such as the athlete’s own feelings. This is an important point: the source of insight into an individual’s own training must not be regarded as existing somewhere along a line between athlete and technical measurements; rather, we discover a much more complicated pattern. In this pattern, emotional experience plays a substantial role. The role of language is also very significant. Using metaphors such as “*elghufs*” simplifies communication between the involved parties. “*Elghufs*” can be understood as a genre. The prerequisite is, of course, that the metaphor or genre has been negotiated into being and is seen as useful for the parties.





In this way, language and material objects as in the Vygotsky tradition will be important mediating factors in human action. Too much emphasis on explicit data and the use of technical instruments can contribute to weakening the development of a complicated feedback system of this sort.

#### **4.6 Not just athletes**

The significance of discernment, intuition, improvisation and the aesthetic dimension of learning and performance development is also to be seen in other high-performance groups. Strati (2003, p. 53 – 75) has researched how good tacticians in their work take their own perspective and sensory capacities as a starting point and use aesthetic judgements as the basis for their work. This is not a matter of logical and rational descriptions: pictures and procedures are the decisive factor. The starting point for learning and performance improvement is found in an intense collaboration between humans, their incorporated knowledge, aesthetic interpretations and the relationship between the person and the forms. Something of this sort is seen in a study of master chefs. Their high performance is due to a mixture of personal qualities, practical training, factual knowledge, but not least to their abilities of improvisation, discernment, and trusting their own intuition in carrying out their work (Gomes, Bouty and Drucker-Godard (2003). The same factors are seen to be decisive for exceptional chess players (Gladwell 2005).

#### **5 Summary – theoretical views and empirical findings**

The theoretical basis and the empirical findings point in two main directions. The one direction has a biological-cognitive starting point and regards skills learning as information processing and mental representations. In traditional training philosophy this analogy is very influential and relates to models of how athletes process information and gain and practice motoric skills. The athlete's body is thus an object that can be rehearsed and trained to obey the will. Composite movements are divided up and analysed piece by piece, the sub-movements rehearsed and the whole gradually re-assembled into complete movements. New technology such as video analysis is heavily used to analyse sub-movements and technique in athletics, ski jumping, ski shooting, etc. As I have shown, such analyses can be used in rather different ways; the degree of involvement and participation on the part of the athletes varies considerably. Sometimes a picture of the trainer emerges that can be compared with the approach of an engineer. Through technical rationality we can find the optimal solutions to most of the challenges in connection with training and knowledge development, resulting in better performance. The trainer-engineer thinks logically and linearly, and bases his work on writing, tables and explicit knowledge. The consequences of such a role will be an ever-stronger emphasis on measurements, registration and tests. In this situation, the various elements in the learning network will also have linear and fixed positions in relation to each other. A fixed authority structure will be established in which the various elements are ranked against each other. Technical measurements will have priority over the athlete's feelings, and the trainer's analysis and instructions will be more important than the athlete's opinions.

The other philosophy shows that knowledge development depends primarily on feelings, discernment, intuition, body, senses, movements and material artefacts which together form a complex interrelationship. The relationship between the various elements of the learning network is fluid. Physical measurements are opportunities that are made use of so that the athletes can actively participate in the situation; the body, feelings and the material artefacts all form important parts of the situated learning.



There occurs, in other words, a constant experimentation with the significance of these elements for knowledge development. Training programmes or instructions will not be taken as absolute rules, but will often be set up against the athlete's own experiences, feelings and possibly information drawn from material artefacts. At this level, individuals use their own interpretative skill as the basis for behavioural changes. In this way, the individual's actions may work back into and modify the contextual framework. By means of such negotiations, the various elements in the learning network become mutually authorised. The need for such a negotiating platform can be understood by considering that we are dealing with the development of extreme performance skills in which the performer, to achieve improvements, should be experimental and ground-breaking. Operating with fixed, one-sided solutions in such an environment will probably be restrictive and little conducive to performance development.

### **6 Practical consequences – the trainer: l'ingenieur or le bricoleur?**

A trainer (and athlete) who is to create performance development must appreciate and understand this interaction and maintain humility about its complexity. By using the distinction between *l'ingenieur* and *le bricoleur* formulated by Lévi-Strauss (1966) the latter type of trainer can be given the attribute of jack-of-all-trades.

*Le Bricoleur* is a jack-of-all-trades who sees different aspects of a situation, understands the unwritten, has insight and can combine and put together new things. The *bricoleur* thinks associatively and in relation to the concrete things he observes, and does not depend on the explicit and unambiguous. It is the reflective rather than the mechanistic trainer who can make use of whatever comes to hand in a practical situation; his own experience and knowledge, observed emotion, concrete objects, language and expressions that he or she uses to get an overview of the situation and to work towards completion of a task – which might be, for instance, developing new knowledge or behaviour in the athlete. In this way occurs what Wenger describes as a *negotiation of meaning* (Wenger 1998 p. 52–54), but in addition, the body, feelings and material artefacts are brought into this opinion-forming process, not just the social connections (*Communities of Practice*).

In the way in which I have studied active athletes and the trainer's role in relation to primary technique development and learning, the distinction between *know – what* and *know how* emerge clearly. Movements, rhythm, feelings and material artefacts are primarily embedded in work practice as a *know – how* entity. Through interaction with the athletes an attempt can be made to further develop this *know – how* in the individual. This takes place, amongst other things, by being close, showing, illustrating, being a practice example and integrating the material artefacts into a greater whole “when they come along” (Brown and Duguid 1998, p. 95).

A corresponding view can be recognised in the use of the term *propositional knowledge*. With reference to Wittgenstein, Nicolini, Gherardi and Yanow (2003, p. 11) observes that this type of knowledge is “acquired through the practical understanding of an operation”. The use of senses and language is central to the development of this type of knowledge, not least in the way I have shown the interplay between senses, language, ideas and participation in practice (Nicolini, Gherardi and Yanow (2003, p. 11)). As an example they describe a good flute maker who has to imagine the sound of a good flute in order to be able to build one. In our case we can also say that an important prerequisite for improving performance is the ability to form an image of and a feeling for “a good movement”, the subjective experience of “flowing”. This requires, of course, participation in the practical activity.



One trainer points out strongly that it is of course necessary to have a theoretical background and much knowledge of physiology, training theory, anatomy, etc, but that this knowledge must never be removed from the field of practice. Practice is much more detailed, complex and individual than theory, and is “strongly connected to what we actually do, that is, to our practice. It is not merely a matter of extracting oneself and then describing it in theoretical terms and expressions – that would be in a way a bit anaemic”. This complicated system of feelings, physical movements, material artefacts, knowledge, language and concepts can be expressed as a form of *proprioception* (the ability to sense the position and location and orientation and movement of the body and its parts) (Gallagher 2003).

Psychologists and philosophers emphasise *somatic proprioception*, which is a semi-conscious process. As already noted, it is possible to “listen” to the body, or at any rate to become more conscious of the bodily signals that exist. In this way, *proprioceptive information* can be used as a means of developing *proprioceptive awareness*. A standpoint of this sort can also be emphasised in the bodily phenomenological tradition. This awareness is an important feature of Lévi-Strauss’ *bricoleur*: It suggests that in order to promote the development of new knowledge it is an advantage that both athlete and trainer have *bricoleur* characteristics; a sense and comprehension of what the practice session yields, their own experience and knowledge, feelings, physical objects, language and expressions which he or she uses to encapsulate the situation, interpret it and work out a completion of the task. Thus the body is not exclusively an object, but, in Merleau-Ponty’s words, a phenomenal body that is experiencing, acting and in search of meaning. We see here that there is no mechanistic connection between body, feelings, material artefacts and other factors in the situation. The performances of top athletes and others are to a large degree a matter of discernment, intuition, interpretative ability and state of mind.



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