



CHAPTER 19

Another dance – about embodied knowledge

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As a physiotherapist I am concerned about how movements are performed to cause appropriate strain on the body in order to avoid the development of musculoskeletal problems.

I have been occupied with that movements should be done in a way that is most suitable for the body. In my experience many people do not follow advice about what will be most suitable ergonomically until they develop pains. Thanks to Jon Bojer Godal I contacted with traditional craftsmen. I found that they moved in a dynamic way, with a flow and movements that seemed easy and light although this work was demanding and physically heavy. As part of his work at Norwegian Crafts Development Godal made a film of an elder craftsman building a traditional open boat "lystring". Godal characterized the craftsman's movements as being like a dance, and he asked me if I could describe them. I watched the film of the craftsman working and it interested me. The movements were greatly in contrast to what I had seen among workers of today using modern tools and techniques.

I started a field study among traditional, experienced boat builders. Traditional craftsmen and crafts are in my definition doing work according to traditional methods using tools developed through generations of experience. The boat

builders used electrical tools to a very limited extent and they followed their product from start to finish. In traditional crafts the tools are mostly manual and the body is the source of energy. This greatly contrasts with today's highly technological society in which the limiting conditions are in the technology and the person does what the technology can not. The boat builders' movements can be described in several ways. They can be understood from the point of bio-mechanics, work physiology, aesthetics, communicating- and cultural perspectives. I will emphasize the connection between the body and the tools in the working situation. In my study I try to describe the movements both from the point of time and space, at the same time as giving an understanding of the kind of knowledge that is built into the movements.

Movement is a kind of practical and embodied knowledge that to a limited extent can be articulated verbally (Grimen 1991). One example is that it is not possible for a person to fully describe *how* he is using an axe, however he is able to describe *that* he is using an axe. A person does not learn how to chop by reading about chopping, he needs to practice chopping. The knowledge is connected to each individual's personal space of experience (Polanyi 1966). Polanyi uses the concept 'knowing' rather than knowledge, since the noun can be understood as a selective existence independent of a person.

Movements are one part of the way of working, and they must be seen in connection with experience with and insight into the work.

The fact that a person is not able to describe the knowledge, or the 'knowing' behind the movements he is doing must be understood in this connection with the fact that the perception attached to the movements is not something the person is conscious about. In the words of Polyanyi (1966) the knowledge has a "from – to structure". The person is turning away from the body to the world, and what the person is directing his attention towards will depend upon how he experiences the world. This focus or selection towards the specific is mostly done without thinking. In performing movements the person is not able to think about what is going on in his body apart from the fact that co-ordinated muscular activity contributes to movement that makes him achieve what he wishes to do. The inner process of the body just takes place, and the person focuses upon the action itself.

The Norwegian Crafts Development characterizes knowledge that cannot be articulated verbally and that can be seen as action-borne knowledge. Here, I choose to use the description of embodied knowledge in order to illuminate that it is not only in the head. This kind of knowledge can be observed when the person is doing physical activities, although the person can not

describe this knowledge in words. In the following text I will try to highlight the connection between perception, sensation and movement, and make it visible that the body is the source of knowledge.

THE UNIT MOVEMENT, SENSATION AND PERCEPTION

Since movement is connected both to sensation and perception, movement is of fundamental significance for humans, both from a biological and an existential perspective. The body is designed to be in motion. From a biological point of view the body needs to be in motion in order not to degenerate. To maintain the biological functions to keep healthy it is necessary to maintain a certain level of physical activity. From the perspective of the philosophy of phenomenology the body is opening up to and gaining knowledge of the outer world through the five powers that the body uses: vision, hearing, smell, taste and touch. Sensation describes the contact between the sensory organs and the surrounding world and the neuro-physiological processes that are initiated as a result of this contact. The perception is about what the person is sensing and how the sense impressions are understood. When the person is acting senses are activated and more and differentiated sense impressions are activated in movement than when the body is not moving. The person gives significance to actual concrete objects depending upon earlier perception (Merleau-Ponty 1962). In perception something is added and what is added depends upon that person's previous experiences (Thornquist 2003). Thus, perception is an active process and is the result of activated sense organs and the selective and perceiving process going on. To be in movement in physical contact with our surroundings gives insight that can not be achieved in any other way. Therefore, the experience of movement is an important part of the human's experiences and knowledge of both the world outside oneself and oneself. In other words, movement can be understood as existential. It is not uncommon to regard sensation,

perception and movement as being independent of each other although they have to be explained as connected to each other. Still, sensory experience and movement represent different physiological processes. Merleau-Ponty (1962) emphasizes that it is never perception followed by movement, perception and movement will always be one system modified in totality. From the point of a phenomenological understanding of the body, movement requires sensation and perception and vice versa, sensation and perception require movement.

Proprioception is embodied knowledge about the various positions of the body thus it is a condition for movement. The proprioceptive sense (organs in muscles, other tissues and joints) is activated both when the person holds and changes body positions. In order to make meaningful, coordinated movements activated proprioceptive functions are a necessity. The proprioceptive activity is different depending on whether the whole or only parts of the body are involved in the movement and whether the movement is fast or slow. Through the proprioceptive impulses the body gains "information" about itself and the surrounding environment. The result of the "information" is going on in the body and the person can not be aware of this bodily "information". An example, we are not aware of the processes going on in the body when bending the knee although we do know that our knee is bending. In that way the "information" – or impulses – from the proprioceptive sense is partly defining the self and partly defining the activity the person is involved in. Therefore, movement can be understood as a focus on the person on a subconscious level.

I myself am inspired by the French philosopher Merleau-Ponty and his phenomenology of the body, which gives insight into how movement is a basic condition for humans. Movement as existence and as biological phenomena requires each other; at the same time as the person is experiencing there

will be biological processes that are necessary to experience. The biological and experiencing body will be important concepts in order both to understand and to explain the conditions of the body. However, in order to do so it is necessary to use several theoretical perspectives. In the following text I will describe the boat builder's movements and in that way illustrate what is meant by embodied knowledge.

TIME DIMENSIONS: CONTINUITY IS MORE IMPORTANT THAN THE EXACT TIME

The boat builders will follow certain procedures where the different parts of the work process have to be done in a certain sequence. It is not possible to create a good project without finishing one task before starting the next. Nevertheless boat builders work calmly and use the time required to finish one task in a satisfactory way before starting to work on the following task. The next stage of the work is planned while they are in the process of completing the previous task. What is happening in the present will move on continuously and just flow on. Boat builders will be in the present, because the attention will always be focused on the task being done. The body and how the movements are done will not be focused upon. Ricoeur (1984) describes the present as divided into three parts; it involves what is in the moment, what was in the past and what is coming in the future. This way to experience time shows the importance of continuity when doing a task in order to work efficiently. Traditional boat builders will not be guided according to fixed times and time schedules, but they will just continue until they are finished. Experienced time is superior to linear scheduled time of the clock. The traditional boat builders do their work in a way that leads them to work continuously without unnecessary interferences. The demands will be in the work process itself, and the experiences of the boat builders will strengthen the process in such a way that it is obvious that the work can not be completed faster through more speedy movements.

Complicated parts of the building process will have to be finished before food, breaks, other pauses or the end of the working day. The working process has to be continuous and can not be guided by fixed time frames. Breaks then will have to be taken at natural pauses in the work process and in such a way that it is easy to continue afterwards. One important element is that there should not be too many details to remember and to take into consideration when work continues after a break.

There is an interplay between manual work and breaks in the work process. The breaks are used to get an overview of what has been done and what should be done in the further work process. The breaks are neither regular nor accidental. They represent a flow between manual activity and overview. The overview is a necessary condition for continuing the manual work. In that way the breaks are an integrated part of the work process and there is a natural change between relaxation, or physiological rest and muscular activity while they perform the work.

Through participation in the work process the boat builders establish ways of doing the work that make it obvious to them that they need to spend the time necessary to work in a proper way and not be frustrated by the consumption of time. Their involvement in the work itself is the most important. In his theory of practice Bourdieu (1977) describes how a person is influenced by his dispositions through patterns of body reactions, ways of thinking and emotional attitudes. The dispositions are the results of exercises; a permanent and social unconscious incorporation of structures, which can be compared to an anonymous and diffuse education.

The boat builders work with organic materials and such materials consist of qualities that have to be taken into consideration in the work. When working with organic materials impulses from several senses; vision, smell, hearing and touch give information about

nuances and variations representing the characteristics of the material that is being worked with. To perceive, consider and adjust to the peculiarities of the object being worked with is however time consuming.

As mentioned, when working with organic materials the craftsman has to make continuous judgments and adjustments. The knowledge that makes this process possible is an embodied competence that creates movements immediately without the craftsman considering how to perform them. The craftsman has the skills to see, explore and adapt throughout the situation. The easy, light and flowing way of processing the work is a result of the reactions and patterns embedded in the body. The boat builder is able to predict what is about to happen and perform the necessary actions. He is continuously able to position the various body parts to solve the tasks of work in a suitable manner because of this inherent bodily competence.

Each craftsman uses his own personal tools, and his way of using the tools informs the required features of his tools. A boat builder who is not familiar with his tools will have problems with them. He then has to go through a "get to know my tools" phase, which might both slow down his production and damage the materials being used. The tools have to be used with ease and different variations of the same kinds of tools are used in order to utilize the qualities of the tools and the materials. The process of work is highly specialized according to the different tasks to be solved.

The boat builder himself has control of the whole structure of his work and when the various parts of that work have to be completed by. He always has an efficient and productive work process, which includes continuous planning and adaptation of the work. To be efficient does not mean to do things quickly and in sequence, but to have a flow of work. The latter is not possible if the craftsman does not finish one task

before he starts on the next one. Working on organic materials the sequences in the work process represent natural stops depending on the craftsman and his understanding of what is important to finish before the next stage in the work process. The work is organized to avoid disturbances of the craftsman's concentration. His attention is directed towards the task he is currently doing until it is finished.

SPATIAL DIMENSIONS: VARIATION – TRANSFERENCE – INVOLVEMENT

Boat builders move across a large area while working and change positions depending upon what kind of tasks they are doing. The whole body is actively involved in performing the movements. The movements are sort of in a flow, even when only part of the body is in contact with the object being worked on. Even when the activity is mainly performed by use of distant body parts the movements are initiated centrally in the body. Activation of large muscle groups/body parts relieves smaller muscle groups/body parts. The whole body moves dynamically in pursuing the task to be done.

The boat builders administer the work schedule in fixed sequences. Such a way of doing the work is important in order to produce good working vessels, and during the work process they continuously have the end result in mind. Also they need to be in a good position to fulfill the specific tasks. For example it is difficult to use the axe in an exact way if the chopping can not be done vertically, and it is of crucial importance to move the plank into position in order to make the plank into a thin curved board. The movements flow through the whole body from one work operation to the next. As stated earlier, the boat builders move frequently, and the position of the body is adjusted depending upon what is done and what tools are used.

The connection between the tools and the body creates a bodily extension. In this incorporation of the tools they sort of "disappear". This occurs since

the connecting point between the body and the tool functions as an extra joint; the senses are united with the tool as the end point. Thus, with the tool the boat builder feels how the material reacts to the finishing process. In other words, through the tools the senses are activated and the boat builder receives essential information to continue with the work.

Since the work requires continuous alterations of positions the space in use expands. When moving the proprioceptive stimuli are extensive and the body is "bombarded" with impulses about itself in connection with the surroundings. A bodily awareness which the person is not recognizing occurs. Therefore a continuous bodily responding to the surroundings is the result of such a process. This can be understood as unarticulated and partly not possible to articulate process of importance for the perception of oneself (Sacks 1985, Gallagher 2005). In order to gain an understanding of that process of self perception in connection to surroundings empirical studies have to be made.

As mentioned, the manual tools need to be moved in order to function and the energy for that movement is transferred from the body to the tool. When tools are used the body is in a continual motion. Since the processing of organic material always has to be adapted to the peculiarities of the material the boat builder always has to relate to new situations. As described before, most parts of the body are involved and contribute to the craftsman's perception of his surroundings. Such a multiplicity of sensory activities make it possible to experience nuances and variations, being not aware of about oneself, while he is aware of his perception of the surroundings.

From my point of view the way traditional boat builders' work most of the time their whole body is actively participating. This includes extensive sensory activity and perception. The boat builder's confident and precise movements are qualities

necessary in order to work quickly and economically, and a good end result. When they for some reason have to explore the way of working, thus the work requires more attention for a period of time until the boat builders adapt to changed work situations. Experienced boat builders have been taught to learn through all the situations they have been facing. As traditional craftsmen develop their own skills in their crafts, they learn at the same time to adapt to new situations as if they were familiar ones.

A striking description of the movements of the craftsmen is that they are in accordance with suitable ergonomic ways of moving making no more strain than necessary on the body. The boat builders, like other craftsmen, develop musculoskeletal problems. The work is frequently heavy, despite traditional ways of working reduce the strain. Traditional craftsmen are conscious of the need to move in a way that restricts the risk of work related strain as much as possible; how to work as efficiently and rationally as possible. Their 'knowing' consists of the complete process including the skills that diminish the risk of work related stress. A workman should be able to go on with his work for a long time, time should not be lost, the products should be of a high quality have the determined functions built in, and be aesthetically pleasing. In order to work in a suitable manner, both in connection to the product and use of the body, it is necessary to have knowledge of the materials, skills in using the tools, and to have a complete oversight of the whole process.

The work is distinguished by the body, tools and working process creating an organic unity, where each part is dependent upon the other parts. Body movements develop through their interplay in this organic unity. The craftsman experiences what are the most suitable and economical movements. Biomechanics and physiological principles suitable for ways of moving are incorporated in the work solutions. Traditional boat builders

develop economical, diverse, dynamic movements that are necessary to deliver sophisticated high quality craftsmanship. The work itself can be understood as the master for ergonomically good solutions for movement, simply because the craftsman is concerned to make good end products. The connection between product quality and movement quality is one of the main characteristics of traditional boat building.

CONTINUATION OF TRADITIONAL CRAFTS

These descriptions of the movements in traditional boat building highlight the fact that personal experiences and the work situation are inscribed in the movements. The movements must be seen as being related to the character of the work. As a consequence, teaching boat building movements can not be regarded as aspects of technology. Suitable solutions about movements are embodied in knowledge that has to be acquired in specific working situations.

Traditional boat building is work that demands extensive bodily involvement. Today the teaching of such work is particularly demanding since daily life has changed dramatically in recent years. In the past the acquisition of craftsmanship skills was part of growing up. 'Knowing' competence in practical activities - was in a way established through participating in daily life activities. Today all this is different. The activities of children and young people and those of grownups are separate. The body is to a great extent passive with the use of the body often being very limited and restricted, accordingly the body has limited variation in sensory stimulation. This bodily alienation is partly a result of the passivity of the body. As a consequence, it is necessary to create learning situations in a way that makes it possible to acquire the knowledge and skills essential to be able to work like a traditional craftsman. One challenging task of the educational system is to ensure that the valuable knowledge learned through generations of experience is maintained and transferred

to new generations. To become a good boat builder is not something that can be learned through reading.

POSTSCRIPT

The concepts of action-borne knowledge or embodied knowledge are helpful in order to emphasize the demand of traditional crafts to presuppose an extensive bodily use of tools in the process of adapting natural organic materials in different situations. By comparing such activities with modern day activities it becomes obvious that great changes are happening regarding the competency of body use.

Today's work and leisure time consists of limited movements, and often movements done while sitting in a chair. Sensory activity predominantly

involves hearing and vision, which from the point of logic will have fundamental consequences both in experiencing oneself and one's surroundings. In order to investigate such aspects it is necessary to undertake further empirical studies. Compared to our post modern work life with the extensive use of high technology, where the body is left to do the things that machinery cannot, and which is to a great extent passive, it is obvious that a traditional wooden boat builder does indeed represent another dance.

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