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Tacit knowledge and knowing at the core of individual and collective expertise and professional action¹

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Introduction

Tacit knowledge and knowing as manifold, challenging and fascinating research phenomena have occupied researchers' minds in many disciplines. In this chapter, we elaborate the diversity, essentiality and significance of tacit knowledge in the construction of expertise as well as in experts' thinking and action. Expertise and tacit knowledge are often considered together in various fields and professions, because they have several characteristics that are closely intertwined with each other. This chapter elaborates the relationships between tacit knowledge and expertise especially with regard to the complexity of tacit knowledge so as to understand the core of expertise. While professional expertise is often viewed through individual facets, it is equally important to incorporate interactive and object-oriented collaborative aspects to its' tacit dimensions (Hakkarainen & Paavola, 2008; Paavola & Hakkarainen, 2005). We elaborate tacit knowledge in relation to skills and competences as well as in relation to the questions of explication and argumentation that are central when thinking about the essence of expertise (cf. Fenstermacher, 1994; Hakkarainen & Paavola, 2008). We elaborate the process and product aspects of tacit knowledge as well as its' individual and collective aspects, which are critical when thinking about the core of expertise. We hope to provide a useful basis for further dialogue on the issue.

After analysing the aspects of tacit knowledge, we present a model in which the characteristics of tacit knowledge and expertise are intertwined into four different perspectives. First, tacit knowledge can be understood as a gradually accumulated knowledge base of an individual expert. Secondly, the tacit expert knowledge base lies in communities, networks and organisations. Thirdly, tacit knowledge is perceived as individual expert action including accumulated experiences in the form of scripts and agendas of action. Fourth, we conclude with viewing tacit knowledge as active and situationally emerging practices in expert communities' action. Along with these four perspectives, we touch upon current research in which the development of expertise is understood as a collective process (Sawyer, 2007) that combines individuals, communities and the objects of their activities (Knorr

Cetina, 2001; Paavola & Hakkarainen, 2005; Sfard, 1998). Tacit knowledge is thus understood as being situational and intertwined to a particular social and material context of action. Although tacit knowledge and knowing are difficult to explicate, they are closely intertwined with cognitive and emotional aspects in experts' thinking and action – and possible to elaborate analytically in a greater detail.

Characteristics of tacit knowledge

The concepts of tacit knowledge and knowing have raised vivid discussions among philosophers and epistemologists (Niiniluoto, 1996; Polanyi, 1966; Rolf, 1995), theologians (Sanders, 1988), social scientists (Gourlay, 2004; Sveiby, 1994), nursing (Nurminen, 2008) as well as among educational scientists (Fenstermacher, 1994; Hager, 2000; Orton, 1993). For example, Fenstermacher (1994), Hager (2000) and Niiniluoto (1996) analyse the complexity of tacit knowledge and define it as one form of knowledge. The concept of tacit knowledge has also been elaborated from the psychological perspective (Argyris & Schön, 1974; Orton, 1993) as it comes close to routines and automated strategies. In the studies focusing on the master-apprentice relationship (Jernström, 2000), tacit knowledge is analysed perhaps in the greatest detail. Tacit knowledge has also been identified in research in the context of business world, where it is understood as collective and organisational (Nonaka & Takeuchi, 1995). While there is actually no consensus about the definition of the concept of tacit knowledge, researchers do agree on its' complexity.

Polanyi's (1958; 1966) well-known theory of tacit knowledge is an epistemological theory, in which (tacit) knowledge is understood broadly, and Polanyi uses alternately the concepts of tacit *knowing* and *knowledge*. Polanyi (1966) defines it broadly in a sense that it covers both intellectual knowledge and other aspects, for example skills and abilities. Polanyi's often-cited notion of human knowledge is that *we know more than we can tell* (Polanyi, 1966, 4). The phrase has become a fascinating label, but it is difficult to define what it actually means. Rolf's (1995) interpretation of Polanyi's tacit knowing and knowledge is helpful as he states: 'When a person orientates himself to reality, he considers or handles, guides his actions with a knowledge which functions in silence or in tacitness. In tacitness the traditions and subjectivity are united. The unification gives him a way to orientate himself towards reality. Polanyi focuses his consideration on the "tacit dimension" of knowledge and acting, where the culture and the individual meet each other. From this tacit dimension he is able to find the

resource, which is known by concepts such as “tacit knowing” or “tacit knowledge” (Rolf, 1995, 20–21).

Despite the multiple perspectives, the majority of the discussion and criticism concerning tacit knowledge seems to date back to the following philosophical-epistemological questions (Toom, 2006; 2012): How is the content of knowledge defined? Does the knowledge cover almost all the conscious and unconscious human actions, or does it cover only some of the human actions defined in a certain way? Also, is the demand of explication always connected with definition and pursuit of knowledge? What about the need for argumentation? Does the focus of interest lie on the contents of tacit knowledge, or the use and emergence of tacit knowledge in action, tacit knowing? In addition, is tacit knowledge situation-specific, and to what extent? We analyse tacit knowledge and knowing by leaning on certain central researchers in this field. Our aim is to elaborate the shared core questions of tacit knowledge emerging from different bases, not to juxtapose them (see e.g. on expertise, Tynjälä, Kallio & Heikkinen in Chapter xx).

Elaborating skills and tacit knowledge

When considering the characteristics of tacit knowledge it is natural to examine it in relation to the concept of skills. In contrast to Polanyi’s or Rolf’s broader conception of knowledge, Niiniluoto (1996) argues that skills can be considered only as a pre-stage of knowledge, not knowledge as such. As a philosopher and epistemologist, Niiniluoto represents a narrower and more traditional view of knowledge. He states that skills are often learnt through the process of trial and error or through imitation or modelling in master-apprentice relationships where learning does not happen according to explicit and rules-governed practices (cf. Rolf, 1995, 116). In this sense, a good example of learning skills is language learning, where language, vocabulary and grammar are learnt in everyday practices so that the learners are not able to explain how they actually are learning. Here, the learners’ knowledge of grammar can be understood as *tacit* because they can act according to its rules but they are not able to formulate and explicate them. In such cases tacit knowledge is often non-verbal. This contrasts to formal and propositional knowledge where things are expressed in declarative sentences.

Argyris and Schön (1974) have been interested in expert action and have the concept of skill central in their analyses. However, instead of using the concept of skill, they describe expert actions through *espoused theories* and *theories-in-use*. Understandings of practice and expertise are embedded in the language, and action of the community is a central tenet (Argyris, Putnam & Smith, 1985). *Theories-in-use* are those that can be inferred from tacit knowledge emerging in expert action, while *espoused theories* are those that experts claim to follow and utilise when describing and justifying their action. They view skills as dimensions of ability through which it is possible to behave effectively in various situations. Experts learn skills mostly through imitating, e.g. they learn to act in line with new theories of action. The view underlines that learning does not proceed from espoused theories to theories-in-use. The argument of Argyris, Putnam and Smith (1985) is that the implicit is central in the investigation of (also) expert theories of action. Espoused and public reflection serves the interest of learning, and brings the two theories closer in line for greater effectiveness in practice. We should also remember that experts learn through feedback and critical remarks of their action that often do not rely on espoused theories (Argyris & Schön, 1974). Overall, we can conclude that while Argyris and Schön as well as Niiniluoto analyse the concept of skill from different viewpoints, they all see that action can produce skills without related verbal explication.

Eraut's (1994, 111–112) view on skilful expertise is in line with the previously mentioned authors and he sees skills as routinised and complex series of actions that experts perform almost automatically. Through routinisation the experts become less aware of their actions and find growing difficulties to explain and explicate them after the action has taken place. Eraut identifies skills as learnt ways of action that have initially been explicit but become then gradually routinised during the action. The stance, in line with Niiniluoto (1996) and Argyris and Schön (1974), brings the skills at the forefront in experts' professional action and underlines tacit knowledge as an essential part in expert practice.

Competencies and tacit knowledge

The discussions of tacit expert knowledge and skilful expert action are often related with notions of professional *know-how* and competence. This underlies the idea that individual experts' competence is always relational and connected to the professional community that they represent. Among professions, lawyers, physicians and even teachers have been active to

claim the expert status and structure their professional competence standards both in the US and Europe especially since the 1980s (Eraut, 1994; Hager, 1993; Pantic & Wubbels, 2012; Toom, 2017). However, competence dates back to professions' traditions through which professional excellence and qualifications are defined (Polanyi, 1958; 1966).

Ryle's (1949) well-known classification of two kinds of knowledge – *knowing how* and *knowing that* – can be useful when elaborating the ways in which abilities, skills and knowledge are connected to expertise. The latter, *knowing that*, states that knowing something can be expressed by mainly propositional claims. Ryle as well as Polanyi and Rolf did not favour this intellectual myth and instead emphasised that *knowing how* requires some prior and implicit consideration of knowledge or ability that cannot be stated verbally (cf. Niiniluoto, 1996, 52–53). This stance implies that the both types of knowledge are to some extent interdependent: *knowing how* consists of both skills and knowledge disposition (Fantl, 2017). It is also interesting to note that until recently Ryle's distinction could be straightforwardly deployed in a variety of contexts - but not anymore: for example, Stanley and Williamson (2001) have challenged Ryle's arguments for the distinction and proposed that *knowing how* is (*contra* Ryle) a species of *knowing that* (see Bengson & Moffett, 2011).

The ability to solve challenging situations is also emphasised in competencies, which are often seen as a cognitive capacity to perform professional actions. However, competencies not only call for knowledge and skills, they also require appropriate attitudes, strategic thinking, and awareness of one's own action (Westera, 2001, 80). For example, a teacher's decision-making during classroom interaction or a researcher's decision-making during an in-depth interview both require immediate action competencies to combine cognitive knowledge with skills and attitudes. For competencies, more than relevant knowledge and skills are needed to provide a qualified expert action. Besides conscious and purposeful decision-making, expert competencies also contain disposition to act as well as abilities to explain and justify the taken or intended actions (Eraut, 1994, 179; Korthagen, 2004, 80–81; Westera, 2001, 75–79). In order to make a clearer distinction between outcome behaviours and competencies, it is important to view competencies, in line with tacit knowledge, as integrated bodies of knowledge, skills, and attitudes. As such, competencies represent a potential for behaviour, not just the behaviour itself (Toom, 2017).

Ways to explicate tacit knowledge

Tacit knowledge and its ambiguities have raised critical remarks especially on the explication of tacit knowledge due to the general epistemological demand for anything called knowledge (Rolf, 1995, 31). Polanyi's (1966) response that tacit knowledge mainly emerges in immediate action situations, and therefore cannot be accurately explicated, draws the line between the two contesting approaches. Polanyi was well aware of this demand and viewed that not even modern developed ways of communication and articulation would solve the fact that at the moment of action "we knew more than we could then tell" (Polanyi 1966, 5). When elaborating the explication of experts' tacit knowledge van Manen (1995, 45) speaks of active consciousness on which the experts rely on action, and Molander (1992) emphasises confidence in expert action in specific moments. This particular consciousness is intertwined with expert practical skills that are embedded in practices and, personal ways of doing things, and therefore it is demanding to explicate (van Manen, 1995, 45-46). This kind of practical expertise is also called silent knowledge (Molander, 1992, 11-12) due to its resistance towards explication and critical scrutiny.

As noted, the explication of tacit knowledge is connected to the ways we define knowledge, and to the ways we want, and are able to, elaborate knowledge practices in action. If tacit knowledge is understood as unstated structures and beliefs underlying a person's action, it becomes difficult to explicate. However, defining and understanding tacit knowledge as a process of knowing similar to competence or know-how opens up new possibilities to search for explications and explanations for it (Toom, 2012).

Perspectives on argumentation of tacit knowledge

In line with explication, the question of argumentation is crucial when tacit knowledge is investigated as knowledge, and it has also confused researchers (Fenstermacher, 1994; van Manen, 1995; Rolf, 1995; Orton, 1993). The demand for argumentation is related to the customary ways of seeing knowledge as well-argued and justified true belief to gain certainty (Niiniluoto, 1996, 49). This kind of demand for argumentation means that all expert knowledge should be available in verbal statements and should be characterised as intellectual (Rolf, 1995, 33–34). This would limit expert knowledge only to occasions where decisions could be based on well-grounded and explicit arguments. Polanyi (1958, 1966), however, defines knowledge from a broader perspective and does not necessitate such a strict

argumentation. Rosiek (2002, 135–137) sees the issue much alike and considers that knowledge can have its status also through practical arguments.

Regarding the argumentation and practical knowledge, Fenstermacher (1994) presents a more demanding view and notes that the concept of knowledge is often too tempting and it has been often used too loosely. He points out that knowledge is more than everyday beliefs and opinions, and expert knowledge can raise thoughts and actions beyond tacit-bound beliefs or opinions (Fenstermacher, 1994, 33–34). This can be done with the help of practical reasoning where the provision of arguments is intended to support valid and meaningful actions. This provision of reasons, when done well, can make action sensible both for the actor and for the observer. As Fenstermacher (1994) concludes, such reasoning can show that an action is “the reasonable thing to do, the obvious thing to do, or the only thing one could do under the circumstances” (p. 47). The argumentation intends to support the needed epistemic value of practical knowledge claims. However, as Fenstermacher (1994) reminds, caution is required because the argumentation of mere tacit knowledge is impossible because it is only partially in human consciousness. Therefore, practical actions are needed to elicit tacit knowledge and make it available for argumentation.

Contextuality of tacit knowledge

Interestingly, at the moment, Polanyi may be most modern in his views of the social and cultural origins of tacit expert knowledge (Rolf, 1995, 15). This notion is largely accepted, and it has been explored in many fields, e.g., in arts and crafts (Jernström, 2000; Tynjälä, 2008), theology (Sanders, 1988), business (Nonaka & Takeuchi, 1995), social sciences (Gourlay, 2002; 2004), nursing (Nurminen, 2008), and education (Burbules, 2008; Fenstermacher, 1994; Toom 2006; 2008; 2012; 2017; van Manen, 1995). In various contexts, tacit knowledge often emerges when immediate actions to demanding situations are needed, and the actions have to be justified in reasonable ways (Westera, 2001; Toom, 2017).

Theologians describe various pastoral care situations that require tacit knowledge. Health care scientists refer to challenging caring encounters between a patient and a nurse, where tacit knowing has played a crucial role in completing them successfully. In teacher research, it is found that teacher’s tacit knowledge is perceived especially necessary in surprising pedagogical moments in classroom interaction (van Manen, 1991b; 1995). In these situations

teachers need to act – or not to act – appropriately in relation to pupils and their learning (Burbules, 2008).

The situations often require experts to perceive their actions from multiple perspectives: carefully evaluate the situation, know participants, and think about the consequences, also for future actions (see Kallio, chapter X). All the intended and performed actions should be executed in the best interest of everybody involved. For sure, it is impossible to learn this kind of knowledge just by reading books. Instead, expertise of this kind can only accumulate through action and reflection of action during a longer period of time.

Tacit knowledge as individual and collective phenomenon

As tacit knowledge contains both skilful individual and cumulative expert knowledge and the processes of knowing, some researchers (e.g. Baltes, Staudinger & Lindenberger, 1999; Krampe & Baltes, 2003) speak about an expert's crystallised intelligence when describing competent expert action. Also Argyris and Schön (1974), through their theory-in-use notion, perceive professional knowledge from an individualistic perspective. They all elaborate tacit knowledge and expertise from individual sources, through which experts, e.g. in master-apprentice relationships, build up their skills and knowledge for action (Jernström, 2000; Rolf, 1995). Besides individual sources, tacit knowledge also emerges from co-operation with others, both explicitly and implicitly.

Organisational knowledge creation (Nonaka, 1994; Nonaka & Takeuchi, 1995) makes available and strengthens knowledge created by individuals together, also connecting it to an organisation's knowledge system. Tacit knowledge is a corner-stone in this shared creation and transforms unarticulated knowledge and skills, senses, and implicit rules of thumb into collective professional practices. Understanding the knowledge conversion between tacit and explicit (Nonaka & van Krogh, 2009) is focal in learning through an organisation's knowledge system. A learning process of this kind demands social skills, abilities and willingness to reciprocity, and also a sense of belonging to an expert community (Lave & Wenger, 1991; Wenger, 1998). Tacit knowledge in expert communities can be seen as a web of places and net of people seamlessly working together (Hakkarainen, Lonka & Lipponen, 2004).

Recent research (Hakkarainen & Paavola, 2008; Lakkala, Toom, Ilomäki & Muukkonen, 2015) has shown that creative expertise requires well-functioning work groups and networks across the disciplines in order to be able to solve problems and innovate (John-Steiner, 2000; Scardamalia, 2002). Hakkarainen and colleagues (2004) have elaborated collective intelligence that emerges in joint actions with experts. They argue that the highly complex problems that experts have to resolve in work require greater reliance on socially distributed intelligence and competence. Seeing individual expertise within the social collectivity is crucial to overcome joint problems exceeding solely individual resources and capabilities (Sawyer, 2007). Thus, caution is required if we focus only on key experts: tacit knowledge is enriched by everybody working in the organisation.

Tacit knowledge as product and process

As we have emphasised above, tacit knowledge is closely connected with skilful expert action and it serves both as a knowledge base for action and as a continuously shaped process of knowing. In theory, the two perspectives can be separated. As an accumulated knowledge base, tacit knowledge covers practical experiences and beliefs across many individual and communal contexts and traditions and develops continuously through action and reflection (Hakkarainen & Paavola, 2008). This kind of expertise develops through clarifying skills, beliefs, and attitudes (Rolf, 1995), but also through knowledge conversion between tacit and non-tacit knowledge bases (Collin, Paloniemi, Rasku-Puttonen & Tynjälä, 2010; Eteläpelto & Tynjälä, 1999). This conversion from intuitive and automatic actions towards more conscious ones, and vice versa, can be seen as an essential condition for becoming an expert (Eraut, 1994; Leinhardt, McCarthy, Young & Merriman, 1995).

When emphasising the process characteristics of tacit knowledge, the concept of tacit knowing is often used (Rolf, 1995; Toom, 2012). This shifts the focus onto immediate situations where expert practices and decision making take place in quick and intuitive actualisations of knowledge and skills in various contexts. The experts' capability to utilise tacit knowledge emerges in situations when they are able to activate knowledge processes in action. In line with Polanyi (1958; 1966), Rolf (1995) states that experts utilise knowledge like an invisible tool and it is thus called tacit. Its broad canvas of competencies is held as a

key to expertise and owes to understanding and sensitivity of what to do or undo in demanding professional situations.

It is important to note that the product and process aspects of tacit knowledge do not exclude each other. Rather, they are complementary as tacit knowledge is developed through practical knowing, for instance, whenever experts consciously organise, classify, clarify, and anticipate their practical actions. Thus, it resonates with the current understanding of expert's competence covering the knowledge base, situational observation and decision making as well as actual behaviour in order to solve the challenge at hand (Westera, 2001; Blömeke, 2017; Toom, 2017). Next, we aim to elaborate the structure and the dimensions of tacit knowing in line with Polanyi's (1966) notions of the topic.

The structure of the process of tacit knowing

Tacit knowing builds upon two dimensions, i.e. the tacit and the focal dimension (Polanyi, 1966), and the relationships between the two knowing activities. Figure 1 presents Rolf's (1995, 67) view of the topic and emphasises the tacit knowledge dimension as a basis for expert action. As Figure 1 shows, tacit knowledge is made of tradition (concepts and theories) and material and situational cues that guide observations and actions. During the process, the experts' perceptions connect their situational cues with concepts that are delivered through tradition, and the unification of these elements is guided by the purpose of professional actions. Together, the elements work like an invisible instrument or tool that purposefully but silently guides experts' process-like knowing and action (Rolf, 1995).

As Rolf (1995) notes, Polanyi's understanding of the tacit dimensions of knowing and action comes close to the ways experts use information and tools in their professional action. Also, the ways experts choose and justify their knowledge and actions are connected to their value-based decisions in particular situations (Rolf, 1995, 70). It is worth noting that Polanyi's strong emphasis on personal - in the form of norms, habits and routines - largely arises from professional traditions, through which it is mediated into individual experts' actions. We also highlight the intentional nature of tacit knowing - from perception to meaning and understanding - as it pervades from situational cues and through tradition-laden theories into action.

FIGURE 1

In educational contexts, Rolf's interpretation of the process of tacit pedagogical knowing strongly resembles van Manen's (1991b) view on teacher's pedagogical understanding. Pedagogical understanding is a complex skill and underlines a teacher's sensitive listening and observation, and it includes both reflective and interactive elements. Its core characteristic is the ability to see situational cues in students during teaching, and besides immediate demands it also stretches over momentary reflective needs. Pedagogical understanding is realised through pedagogical tact: a disposition to act in ways that maintain good and workable relations with others. Thus, pedagogical understanding and tact and tacit knowing are different aspects of the same process (van Manen, 1991b). Further, exercising the tact (van Manen, 1991a; 1991b; 1995) comes close to tacit knowing. In order to handle interactive situations successfully, an expert needs knowledge and skills to perceive specific situations in detail, understand their meaning from multiple points of view, and know how to act – or not to act – in relation to consequences (see Seppälä, Lindblom & Kallio, Chapter xx). The process clearly has characteristics similar to Polanyi's notion of tacit knowing and action. Van Manen (1991a; 1991b; 1995) also reminds that the (reflection and action) phases are closely connected and can be seen as an integrated whole where multiple perspectives and emotions actually build up tactfulness (Kallio, 2011).

The notions of expertise both in Polanyi's tacit knowing and in van Manen's pedagogical understanding have much in common. Their essential core is the purposeful professional action that is guided by both situational cues and more sustained elements of expert knowledge. Tacit pedagogical knowing, in turn, emphasises the use of professional knowledge and skilful action, and can be explicated. Thus, it is comparable to the concept of competence elaborated earlier in this chapter.

Discussion: the relationship between tacit knowledge and expertise

In conclusion, we want to pay attention to the core elements of tacit knowledge among experts, where tacit knowing is built up by the dimensions of expertise and by the nature of tacit professional knowledge in practice (see Figure 2). We have attempted to show how expert tacit knowledge has both *individual* and *collective* characteristics tightly connected to each other and to expert contexts and cultures. Moreover, the *product* and the *process* of tacit

knowledge can be theoretically and conceptually separated from each other even if these two dimensions are functioning inseparably in practice.

FIGURE 2

Regarding experts' tacit knowledge as an *individual* and *collective* phenomenon, we should remind ourselves that collective practices in communities (also) emerge in individuals, much alike skilful individual action contributes positively to collective action. Recent research on expertise (Hakkarainen & Paavola, 2008) emphasises the collective and social characteristics of expertise. It has strong links with socio-cultural theories (Hatano & Oura, 2003; Lave & Wenger, 1991; Wenger, 1998) which underline that intelligent (and skilful) action cannot be executed neither understood without close connections to its social and cultural contexts.

We have emphasised how tacit knowing is a central element in well-functioning professional interactions and work processes. Expert's tacit knowledge closely refers to implicit knowledge elements underlying action, such as personal and collective beliefs, attitudes, and values. While these knowledge processes are conscious only partially, it makes the articulation of tacit knowledge difficult. Expert tacit knowing appears only in competent actions where object-oriented moves, both individual and collective, are realised (Hakkarainen & Paavola, 2008; Paavola & Hakkarainen, 2005). Due to their complexities, it is often possible to articulate the process of knowing only afterwards. As Figure 2 shows, the product and process aspects of tacit knowing are reciprocal: while the customary habits and practices influence skilful expertise, also new ways of doing and understanding are developed and constantly adopted in the experts' matrix.

The essential question is then: How are tacit knowledge and knowing related to the construction of expertise? The elaboration of tacit knowledge is closely linked with research on collective and networked expertise (Sawyer, 2007), where expertise is not only an individual characteristic, but rather constructed in interactions between individuals and the community (see also Murtonen & Lehtinen, chapter X). Expert communities have their unique cultures and practices, on which they rest and function (Lave & Wenger, 1991; Wenger, 1998). Expertise is realised through participation in collective knowledge creation processes and construction of shared practices (Hakkarainen & Paavola, 2008). In networked expertise, individuals' actions promote the functioning of the whole community and vice

versa (Tynjälä, Välimaa & Sarja, 2003). Thus, the group of experts can survive, or even grow, from the challenges that any individual expert could not solve alone. Within the shared knowledge reserve, experts have their own areas of expertise upon which they are able to utilise the community's knowledge reserve. In well-functioning expert communities, professionals have shared abilities to solve new and demanding challenges (John-Steiner, 2000; Sawyer, 2007), where the collective tacit knowledge plays a central role as experts can employ networks and thus exceed their individual capabilities. This calls for well-functioning social relationships among experts, which makes it possible for everybody to explain and understand the functioning of an expert community (Elliot & Pedler, 2018; Tynjälä, Nuutinen, Eteläpelto, Kirjonen & Remes, 1997).

Finally, our analytical elaboration of tacit knowledge and knowing leads us to bring together various definitions from different perspectives in order to disperse the ambiguity and vagueness around the concept and practice of tacit knowledge and knowing. The analysis encourages us to ask if we are in danger to lose some essential features in the tacit knowing of experts, and in expert networks. We speak about such issues as affectivity, spontaneity and interactivity. And if something essential is lost, then the phenomenon can be reached again only in authentic contexts: in master-apprentice relationships, collective problem solving situations, or in real-life professional interactions.

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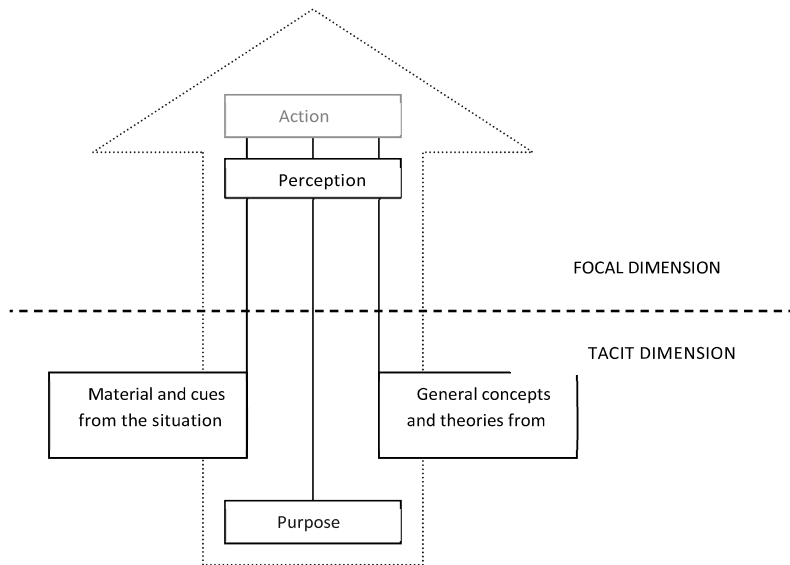


Figure 1. Structure of tacit knowing according to Polanyi (Rolf, 1995, 67; Toom, 2006, 67)

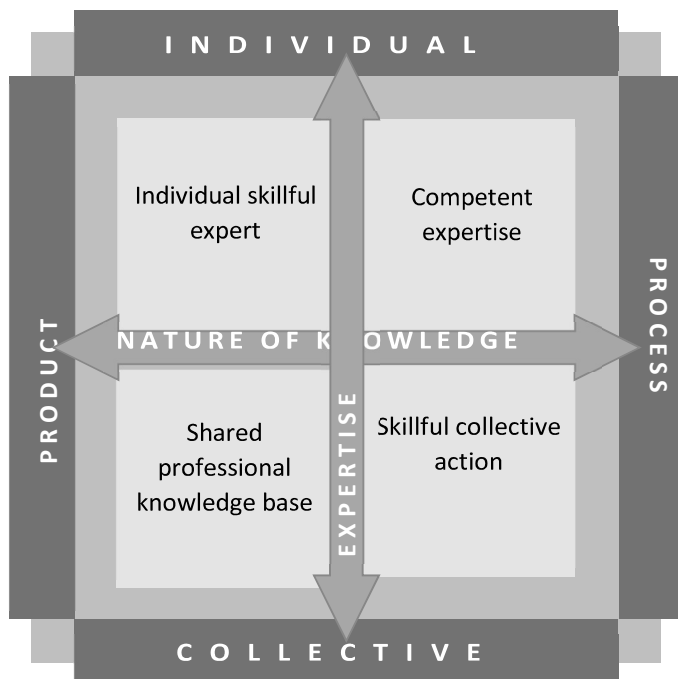


Figure 2. Elaboration of tacit knowledge in terms of expertise and nature of knowledge (cf. Toom, 2008, 54).

ⁱ An earlier and more limited version of this chapter has been presented in Finnish in Toom (2016).