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Towards a Socio-Cognitive Approach to Knowledge Transfer

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ABSTRACT Dominant research streams in the knowledge transfer field, such as the positivist and social constructionist approaches, largely assume that knowledge transfer is accomplished through instructions and/or socially constructed practices. Underlying these views is the belief that texts and practices carry with them the codes necessary for their own decoding and therefore enable an unproblematic knowledge transfer. In contrast, we argue that the decoding of information into meaningful knowledge is always mediated by people’s private and cultural models, which are created from the unique combination of their cognitive dispositions (i.e. acumen, memory, creativity, volitions, emotions) and socio-cultural interaction. The degree to which people apply these models reflectively and/or categorically (i.e. automatically) depends on the need for cognition as well as environmental demands and feedback. Therefore, knowledge transfer is always tentative, because it depends on the application of private and cultural models along the continuum that goes from reflective to categorical processing. We present first a critique of the positivist and social constructionist positions; then we introduce a socio-cognitive model that captures and explicates socio-cognitive processes involved in sense making during knowledge transfer. Finally, we explore future research streams and managerial implications.

INTRODUCTION

Knowledge management and its transfer are not only a hot topic in management research but also in industry practice, with leading companies reshaping their organizations to improve their ability to manage knowledge sharing and transfer within and across organizational boundaries (Corso et al., 2001). Extensive research suggests that an organization’s ability to transfer knowledge effectively improves its range of activities, such as learning (Duncan and Weiss, 1979; Fiol and Lyles, 1985), competence (Olivera, 2000; Werr and Stjernberg, 2003) and coordination (Yates, 1989), and buffers the firm against disruptive effects from employee turnover (Argote et al., 1990; March, 1990). In this context, knowledge transfer refers to the process and outcome by which an

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individual is affected by the experience of others (Argote and Ingram, 2000). Conversely, knowledge transfer also represents the potential for individuals to convey messages about their observations and ideas (von Krogh et al., 1994, p. 61).

Research about knowledge transfer has emerged from various competing epistemological approaches that provide diverse theoretical and methodological views (e.g. Empson, 2001; Spender, 1998a). Two major research approaches are dominant in the field, namely positivism and social constructionism. Positivist studies assume that ‘objects in the world have meaning independently of consciousness’ (Crotty, 2003, p. 27); that is, meaning resides in texts and its successful decoding lead to intelligible and univocal knowledge transfer. For example, Buckley and Carter (1999) argue that knowledge as an entity can be accumulated and stockpiled independently of an individual mind. Similarly, Gupta and Govindarajan’s (2000) study on knowledge transfer in multinational firms suggests that knowledge-sharing practices depend on knowledge assets, the richness of communication channels, and the absorptive capacity of the receiving units.

From the social constructionist perspective, knowledge is socially produced and defined through its social usage; words take on meaning within the context of ongoing practices and relationships (Gergen, 1994). As such, knowledge exists in codified disembodied systems within organizational rules and practices. This leads to the assumption that structures, practices, and routines within and across organizations serve as conduits of knowledge transfer (e.g. Brown and Duguid, 1991, 2001; Gherardi, 2000, 2001; Handley et al., 2006; Lave and Wenger, 1991; Roberts, 2006; Wenger, 1998, 2000). Said differently, ‘organizations as systems possess a sort of communitized, collective expertise, a collective mind and thus a capacity for organizational learning’ (Willke, 1998, p. 6). Tellingly, a parallel exists between aforementioned epistemological positions, namely that knowledge is embedded in and determined by disembodied structures that influence people’s sense making. In other words, knowledge comes with its own codes that enable the receiver to interpret it unproblematically.

In contrast to the positivist and social constructionist position we propose a socio-cognitive model suggesting that knowledge transfer is always endogenous to the mind and body. As such, it challenges aforementioned epistemologies and their descriptions of knowledge transfer. Sense making necessarily takes place in the mind, and although influenced by environmental feedback mechanisms (i.e. media, social interaction, etc), the latter only gain meaning based on people’s mental (private and cultural) models and need for cognition (i.e. categorical and/or reflective thinking) including acumen, memory, creativity, volition, emotions (Bandura, 1986; Bindra, 1976; Bunge and Ardila, 1987; Hebb, 1966; Piaget, 1977). That is, the meaning of external events (and thus their role as carriers of knowledge) always depends on the perceiving mind.

Although we are certainly not the first to propose an integration of the broad literature on cognition and social interaction (cf. Garud and Rappa, 1994; Ginsberg, 1994; McGrath and Hollingshead, 1994; Thompson and Fine, 1999), we contribute to the existing literature by explaining disparate knowledge outcomes within a theoretical framework whose point of departure is the mind of the individual rather than the social mind emerging from group thinking (cf. Ginsberg, 1994). That is, although other research has argued for the importance of incorporating both agency and the social aspect, research has yet to propose a theoretical model that (1) is based on an underlying
embodied perspective that (2) is able to account for contradictory knowledge outcomes across existing epistemology field of inquiries. Typically, the development of a coherent model is often stated as an important topic for future research to explore (e.g. Garud and Rappa, 1994; Ginsberg, 1994).

Our socio-cognitive model accounts for various explicit and tacit knowledge outcomes as originating from the interaction between people’s private and cultural models, need for cognitive (i.e. categorical and/or reflective) processing, and environmental feedback. The change from a disembodied (i.e. positivism and social constructionism) to an embodied position is more than a rhetorical move as it radically challenges the disembodied notion of knowledge, yet enables social feedback mechanisms to enter. More specifically, the socio-cognitive model contributes to existing literature on knowledge transfer as it explicates (1) how embodied cultural and private models (cognitive context) (2) become applied reflectively and/or categorically (cognitive process), and (3) updated through social context (environmental feedback). This leads (4) to four major knowledge transfer scenarios (i.e. negotiated, collective, unique, and stereotypical knowledge production).

The article is laid out as follow. First we identify, describe, and critically review the positivist and social constructionist views of knowledge transfer. In doing so, we take a devil’s advocate position, which, though at risk for representing an overly categorized rendition of positivist and social constructionist paradigms, points to salient epistemological tenets that makes these positions problematic. We then introduce the socio-cognitive position and show how it is able to embrace a multi-dimensional account of knowledge outcomes and transfer within a coherent epistemological framework. We end by discussing future research directions and managerial implications.

THE POSITIVIST APPROACH

Core Idea

The positivist perspective is central to the economic theory of the firm, notably work pertaining to information economics (Casson, 1997, 1999), the knowledge-based view (Conner and Prahalad, 1996; Grant, 1996; Kogut and Zander, 1992, 1996; Prahalad and Hamel, 1990) and the resource-based view of the firm (Barney, 1991; Wernerfelt, 1984). It regards knowledge as an objective entity, which leads positivist researchers to treat knowledge as ‘a thing out there’ that can be transmitted or exchanged without any intervention by a cognizing mind.

More recently, researchers have extended transaction cost economics to issues of knowledge management (Foss, 2003; Williamson, 1999), positing that knowledge is synonymous with information and viewing it as a commodity whose comprehension is unproblematic or happens exogenous to the individual knower. Thus, knowledge ends up being treated as an exogenous variable (Priem and Butler, 2001). This position is exemplified by Casson’s (1999) information-cost approach in which the author suggests that actors and organizational units specialize in collecting and processing objectified information. Casson (1999, p. 78) writes, citing Stigler (1961), that ‘information can be thought of as an abstract commodity . . . , flowing along the channels of communication defined by the organizational structure of the firm’. Similarly, literature on organiza-
tional memory and learning implies that knowledge can be codified, stored, and later retrieved by anyone in the firm (Bontis et al., 2002; Olivera, 2000; Walsh and Ungson, 1991). Furthermore, positivists argue that knowledge consists of objective facts (Donaldson, 1997) that can be measured (Gupta and Govindarajan, 2000) independently of the inquiring, interpreting, creative mind.

The use of technology, such as computer memory systems, has added to the myth that knowledge exists in disembodied structures (e.g. databases, files, texts, instructions) with self-evident meaning independent of the inquiring and interpreting mind. For instance, a business report or an academic article is regarded as a piece of ‘information’ that contains meaning apart from the situated reader. This assumption leads to the use of technology and texts as conduits (Axley, 1984) for knowledge transfer within and across organizations (Davenport and Prusak, 1998, p. 68; Hansen et al., 1999).

The positivist epistemology also influences the very research questions that can be addressed because of the assumption that ‘there is some permanent, ahistorical matrix or framework to which we can ultimately appeal in determining the nature of rationality, knowledge, truth, reality, goodness, or rightness’ (Bernstein, 1983, p. 8). Thus, the research inquiry focuses on procedural measures rather than interpretive perspectives. As Alvesson and Kärreman (2001, p. 1007) put it, ‘it is assumed that stored knowledge provides templates for thinking as well as acting’. In other words, meaning is embedded in the word or symbol rather than in the mind that perceives it.

**Critique**

We challenge the assumption that meaning is embedded in text and exists apart from the perceiver. As Reihlen and Ringberg (2006) empirically demonstrate in a study on computer-mediated knowledge management systems, knowledge artefacts always depend on people’s understandings and interpretations. For example, they show that consultants constructed different interpretations from the same data source and that these outcomes remain overlooked. These findings follow Mahner and Bunge’s (1997, p. 64) argument that the meaning of information always depends on the mindful receiver. Tuomi (1999) makes the iconoclastic argument that the assumed step-by-step process, progressing from data to information to knowledge, actually should be reversed: knowledge (i.e. mental frameworks) must exist before information can be formulated (i.e. interpreted) or data measured to create information. Tuomi’s (1999) central argument is that knowledge does not exist outside the knower (see Alavi and Leidner, 2001, p. 109), which coincides with Wittgenstein’s (1953) assertion that knowledge or logic of facts is fictional and that there can be no representation of the logic of facts. As Axley (1984, p. 431) argues, ‘words have no specific meanings, per se, apart from the idiosyncratic meanings existing in the heads of the people who use them’.

Paradoxically, though positivist researchers recognize that miscommunication occurs, they regard it as stemming from a lack of absorptive capacity rather than divergent interpretive frameworks. A minimum level of absorptive capacity certainly is a necessary prerequisite for sense making, but it does not guarantee that two people rely on similar interpretive frameworks or that it leads to a shared understanding (i.e. intersubjectivity). The positivist assumption that texts serve as carriers of objectified meaning (Boland et al.,
1994, p. 459) has led this literature to remain unconcerned with the amazingly complex system of linguistic patterns and classifications that two persons must have in common before they can adjust to each other’s assumptions – these are all background assumptions (Whorf, 1956, p. 211).

THE SOCIAL CONSTRUCTIONIST APPROACH

Core Idea

In contrast to the positivist research approach, other scholars in the knowledge management field embrace knowledge as socially constructed. This position assumes that knowledge is largely created by socio-cultural processes and becomes expressed symbolically and/or enacted in practices (Brown and Duguid, 1991, 2001; Gherardi, 2000, 2001; Lave, 1988; Lave and Wenger, 1991; Orlikowski, 2002; Wenger, 1998), activities (Blackler, 1993; Spender, 1995), shared thought worlds (Dougherty, 1992; Fleck, 1979), collective knowledge (Corley and Gioia, 2003; von Krogh and Roos, 1995; Willke, 1998), and/or discourses (Bechky, 2003).

The practice-based aspect of the social constructionist approach has become especially influential among researchers interested in understanding organizational conflicts, knowledge transfer, and organizational productivity (Brown and Duguid, 1991; Gherardi, 2000, 2002). In this conceptualization, knowledge is constituted and transferred through practices and activities. For example, Tsoukas (2005, p. 5) notes that ‘knowing is action’, and Blackler (1993, p. 879) suggests that the appropriate focus for an analysis of knowledge work is not knowledge or knowledge workers but rather activity (practice). Similarly, Brown and Duguid (2001, p. 198), in their discussion of tacit versus explicit knowledge, suggest that practice is a remedy to establish a shared conceptual framework.

From a social-constructionist perspective, the resolution of divergent knowledge can best be accomplished through practice. In Brown and Duguid’s (2001, pp. 206–7) words, networks of practice create complex ‘ecologies of knowledge’.

Paradoxically, whereas the present assumption within the social constructionist approach is that practice carries meaning, the early works of practice-based research, especially that by Dewey (1971) and Schön (1983), included reflectivity as an important component. The inclusion of the latter has been largely overlooked in later works. Ironically, practice now constitutes the black box within which knowledge is embedded, stored, and transferred. For example, Gherardi (2000) argues that practice must be understood as a system of activities in which knowing is not separate from doing. That is, learning requires an object that marks it and that is empirically circumscribable, which means that learning is enacted within the boundaries of a practice (Gherardi, 2001, p. 132). As such, knowledge exists within the ephemeral fabric of organizational systems, routines, archives, memos, and so forth (Corley and Gioia, 2003; von Krogh and Roos, 1995; Willke, 1998). At its logical end point practice has an ontological life of its own that enables researchers to propose that practice, in some tacit fashion, may resolve organizational conflicts, improve knowledge transfer, and increase organizational productivity (Orlikowski, 2002; Spender, 1998a, 1998b).
An extension of the practice perspective is represented in Dougherty’s (1992) research on thought worlds and product innovation processes. She identifies four different thought worlds (based on and circumscribed by specific practices) across four managerial departments (i.e. R&D, sales, manufacturing, and planning) and argues that people across these departments rely on different frameworks to interpret technology market issues (Dougherty, 1992, p. 187). Her position parallels Lévi-Strauss’s (1966) structuralist position, which holds that cognition is largely shaped by underlying socio-cultural structures. According to this perspective, humans are subjects ‘whose sense of reality is conceived as a construction, as a product of signifying activities which are both culturally specific and generally unconscious’ (Sarup, [1988] 1993, p. 2). On a similar note, Bechky (2003) argues that various practices across occupational communities create different tacit knowledge structures (i.e. local understandings) that require shared practices to be bridged. The notion of the self as a synonym for consciousness gets deemphasized, and instead activities and discourses are presumed to represent shared ‘webs of significance’ (Geertz, 1973) within which people are ‘completely instructed’ (Sarup, [1988] 1993, p. 136).

Critique

The conventional notion that practice serves as the propagator of knowledge transfer mirrors in a peculiar fashion the positivist position, except that practice rather than texts serves as carriers of objectified meaning. Although knowledge production and transfer are regarded very differently in the two epistemological positions, the end result is that knowledge in both positions exists as codified and objectified in entities that are separate from the cognizing mind. As such, both positions rely on a key assumption of semantic stability and ahistoricity, that is, stable webs of significance (e.g. Geertz, 1973).

However, to equate practice with knowledge is to ignore the immense amount of pre-existing knowledge that both sender and receiver must have in common for the receiver to infer and categorize the intended meaning of a practice. Moreover, there is an important difference between knowing how to do something and knowing why something is done. For example, Bechky’s (2003) argument, that people in different professions (engineers, assembly workers, etc) need to have objects in common that can mediate their varied thought worlds, disregards that a profession by definition is based on a unique set of expertises. That an engineer may be shown a product (rather than a drawing) to make sense of an assembly worker’s comments (e.g. Bechky, 2003) has little to do with knowledge being embedded in practice or the product and much to do with these workers’ application of closely related and shared pre-existing knowledge frameworks. Additional non-practice based feedback, such as an explanation by an articulate assembly worker, an independent inspection of the product, and/or the instructions in a protocol (describing the assembly process) could presumably have led to the same outcome. That said, the latter activities would be meaningless to a person not already well trained in this knowledge area. Without pre-existing mental models that enable the inquiring engineer to decipher and conjecture the logics of an assembly sequence, there would be little transfer of understanding through practice. In other words, practice
without the presence of relevant mental models with which to process the observed practice the transfer will merely consist of meaningless imitative processes.

Highlighting practice as an information carrier is to locate meaning in objectified structures (i.e. action) rather than in the subjectivity of the mind. By externalizing meaning in artefacts and practices, researchers end up focusing only on aspects of the knowledge transfer process. This creates an ‘inversion’ (Latour and Woolgar, 1979, p. 240) in the logical flow of knowledge transfer as it prioritizes objectified properties of practice rather than the mental models brought to a task. Tellingly, most practice-based research illustrates the practice perspective with empirical examples that involve lower level unskilled work and/or standardized procedures whose implementation relies largely on automatic and imitative processes, such as highly standardized production systems where workers’ sense making is not required as long as they can reproduce a sequential pattern of movements (see Roberts, 2006, p. 635). However, the ability to imitate is of little value in knowledge-intensive organizations where much knowledge-work is conceptual in nature. Here, knowledge transfer requires that people rely on their ability to identify the intended meaning through discursive turns and ongoing negotiation of the meaning of a particular practice.

With the mind being a passive carrier of knowledge, knowledge transfer is relegated to the dark and tacit corners of the subconscious (see Orlikowski, 2002, p. 251). Tellingly, tacit knowledge tells us nothing about how members of a practice community are able to change practice and/or innovate (Roberts, 2006). Schön (1983, p. 282) addresses this issue when stating that ‘when a practitioner does not reflect on his own inquiry, he keeps his intuitive understandings tacit and is inattentive to the limits of his scope of reflective attention’. In addition, even the passing along of simple routines by sharing them in practice (e.g. how to make a cup of tea) rests on the presence of a large amount of pre-existing knowledge. As such, practice does not provide semantic codes for its own decoding (i.e. sense making); those codes have to already exist in the mind of the interpreter. This conundrum becomes pertinent to historians, archaeologists, and ethnographers when they work at inferring the meaning of texts, artefacts, and rituals.

Practices constitute one among many environmental feedback mechanisms (e.g. books, instruction manuals, videos, social interaction, technical trial/error) whose meaning is shaped by mental models and general intellectual acumen (i.e. categorical/reflective thinking). Typically, data inconsistent with a person’s evaluation (mental models) are either ignored or appear as noise (Garud and Rappa, 1994, p. 347). According to Weick (1979) such bracketing of perception occurs because people may be more interested in confirming their belief than in actively trying to disprove them, constricting its holders to predisposed absorption and creation of knowledge. Without taking into account that meaning is mediated by people’s mental predispositions, practice-based research is unable to explain creativity, innovation, and the transfer of meaning among knowledge workers (see Roberts, 2006, p. 629). As Duguid (2005, pp. 109, 115) writes, claims about its inherent social character put community-of-practice theory at odds with individualistic approaches to knowledge and therefore only address certain topics involving specific types of communities and networks. In a similar vein, Handley et al. (2007) argue that practice-based researchers assume a large degree of cohesiveness within the
community of practice, leaving issues of knowledge transfer across communities a highly problematic endeavour.

Although elaborate behavioural models may point to covariance among observable activities, they remain unable to account for underlying cognitive processes. As Kaspersen (2000, p. 42) succinctly notes, ‘structures appear only in our memory traces when we reflect discursively over a previously performed act’ (see also Bunge, 1996, 1998; Giddens, 1984). After all, social practices pass ‘through the heads of people, and it is such heads, not immaterial minds, that do the feeling, perceiving, thinking, and the like’ (Bunge, 1996, p. 303). While communities of practice exist, some members may still interpret shared practices differently. In order for members to share the meaning of a practice an immense amount of shared knowledge must already be present. Practice is similar to sentences in a text; its grammar or structure is not meaningful apart from the meaning that is assigned by the receiver (Levinthal and Rerup, 2006).

It is only after we have learned to read a clock and understand the fluidity of time that the clock may appear to serve as an intermediary or carrier of meaning (Zerubavel, 1997). For a knowledge transfer to be meaningful, both sender and receiver must share a considerable amount of pre-existing knowledge structures. Any additional learning depends on such pre-existing knowledge and can only be incrementally build upon already internalized mental models (knowledge). The same is true for practice. For example, that a nurse during a surgery knows how to interpret the wink of an eye by the surgeon has to do with the nurse already knowing (i.e. shared knowledge) what this wink means in this particular context. Social constructionist and practice-based research is at best capturing the back-end of knowledge transfer that involves shared pre-existing knowledge within the mind of interacting individuals.

That said, environmental feedback mechanisms (e.g. practices, social interaction) still provide valuable insights. That is, although not meaningful outside the context of the mind, environmental feedback deepens and broadens (i.e. by slowly updating) individuals’ sense making processes. By incorporating cognition we explain the workings (or lack thereof) of knowledge transfer, whether this is achieved through practice and/or conceptual thinking (during managerial evaluations of competitive actions and possible strategic responses) (Bandura, 1986; Ginsberg, 1994; Rescher, 1988, 2000).

A SOCIO-COGNITIVE MODEL OF KNOWLEDGE TRANSFER

Overview

Our socio-cognitive theory attends to the intricate role of cultural and private mental models and how these are applied categorically and/or reflectively by the person in response to socio-cultural feedback mechanisms, and subsequently, how this leads to (and explains) very different meaning (knowledge transfer) outcomes. This process is depicted in Figure 1.[2] Current knowledge transfer research overlooks much of the interpretive work performed (and required) by the person (Dougherty, 1992, p. 187) as it objectifies meaning within disembodied structures. This is problematic as even people with similar education and training, and engaged in the same practices may end up producing different conceptualizations of a given phenomenon and/or activity due to
unique mental models, cognitive dispositions and life experiences. For example, Boland (1993) shows how two senior accountants apply different (cultural and private) mental models when evaluating codified data describing junior accountants’ performance.

The disembodied notion of knowledge in positivism and social constructionism is increasingly being questioned (e.g. Cobb, 2000; DeGrandpre, 2000; Garud and Rappa, 1994; Ginsberg, 1994; Reich, 2000; Sutter, 1999; Tryphon and Vonèche, 1996). DeGrandpre (2000), for example, argues that it is when a person experiences the consequences of his or her actions in an ecological context that the possibility of new meaning arises. That is, the relation of the cognizing mind and culture is considered mutually complementary and coevolving, because the development of either part depends not only on the other but also is made possible through the productive existence of the other (see also Heinrich, 2004; Vogel, 2000).

Although Garud and Rappa (1994) propose a socio-cognitive model it still embraces an objectification of knowledge that enables artefacts to dictate standards of comprehension. This process includes an ‘objectification’ of shared cultural models among participating members. This makes it unnecessary for the authors to further investigate whether other factors underlie the perceived externalization of knowledge. Finally, Garud and Rappa (1994) suggest that social feedback guarantees the cementing, enhancing, adjustment, and/or tearing down of existing knowledge structures in a predictable fashion. However, if this predictability indeed were the case it means that social feedback processes serve as conduits of objectified meaning – a stance we deconstruct above. Rather, it is the cognitive, emotive, and volitional processes of the thinking subject that makes environmental feedback (e.g. social interaction and practices) meaningful (Ginsberg, 1994; Piaget, 1977; von Glasersfeld, 1995). We argue that knowledge transfer stems

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**Figure 1. Cognitive outcomes in knowledge transfer**

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from recursive processes, which involve: (1) cognitive context (embodied cultural and private models); (2) cognitive content (reflective and/or categorical processing); and (3) environmental feedback. The interaction leads to (4) at least four possible cognitive outcomes, each of which (5) may be confirmed/disrupted based on cognitive context.

The socio-cognitive approach moves researchers away from a disembodied and deterministic understanding of influenced but not determined sense making by emphasizing that knowledge transfer relies on individually embodied processes by environmental feedback (Bandura, 1986; Bunge, 1996; Reihlen et al., 2007). Next, we briefly describe each of these processes.

**Cultural and Private Models**

Research that explores the intersection of culture and the individual argues compellingly that cognition consists of subsets of shared cultural models that organize much of how people make sense of the world (Clifford, 1987, 1993; D’Andrade, 1992; DiMaggio, 1997; Macrae and Bodenhausen, 2001; Shore, 1996). According to D’Andrade (1992, p. 29), a cultural model can be understood as ‘an interpretation which is frequent, well organized, memorable, which can be made from minimal cues, contains one or more prototypic instantiations, and is resistant to change’. Cultural models become internalized through everyday shared experiential processes (DiMaggio, 1997). By experiential processes we refer to cognitive patterns that result from all types of inputs, such as instructions, communication, observation, practices, etc. Inevitable, each person is exposed to various aspects of the socio-cultural fabric, leading to membership of a subset of socio-cultural thought communities (Shore, 1996). Each thought community is identified by a dominant cultural model that provides certain assumptions and outlook on the world (Ringberg et al., 2007). With cultural models being part of a person’s cognitive resources they influence his/her world view and aims, as well as how he or she goes about interpreting and reacting to other people, information, and situations (Hundeide, 1995; Zaltman, 1997). For example, in organizational research, Schminke et al. (1997) illustrate how people’s moral judgments are guided by cultural models they apply.

Conversely, although cultural models create a harmonizing effect, people clearly are not cognitive clones of culture. Cultural models are interspersed with private mental models. Private models may originate from a person’s creative (and even unintended) combination of existing cultural models as well as unique cognitive dispositions (self reflection, critical thinking, acumen, memory, etc). Some private models always remain idiosyncratic (i.e. private), while others may enter into the socio-cultural fabric and establish new cultural fads (Berger and Luckmann, 1967). Both private and cultural models help people organize events and, as such, free up cognitive resources that can be applied to less familiar issues and experiences.

The idiosyncratic and subjective aspect of cognitive processing has been articulated by postmodernist researchers who argue that people are builders of their own world (Baudrillard, 1985), creating and reshaping prevalent representations according to personal life stories (Derrida, 1976). This postmodernist view of knowledge is partly echoed by constructivist psychologists. Kelly (1970), for instance, in his personal construct
theory, argues that people organize their experience by developing personal constructs. The personal histories of people influence their way of perceiving the world and constructing reality. Similarly, Maturana and Varela (1980) suggests that the human mind is an autopoetic system – a self-creating, self-sustaining system in which meaning is created according to internal criteria the mind has developed for itself.

Yet, any sharp distinction between private and cultural models is purely analytical; in real life, such distinction is gradual and depends as much on a person’s cognitive dispositions as it does on life experience.

Feldman and Pentland (2003) provide an argument in which they suggest that routines (i.e. practices) consist of two elements: the ostensive and the performative. The ostensive element comprises individuals’ cognitive understanding of the processes, while the performative element consists of actual behaviour. From a socio-cognitive perspective it is the ostensive processes we are interested in understanding (see also Levinthal and Rerup, 2006, pp. 308, 310). The cognitive understanding relies not only on cultural and private models but equally on how these are applied by cognitive processing, spanning from excessive automatic (as in categorical) thinking to extreme self-reflective (as in reflective) thinking. We turn to these two processing types next.

Categorical and Reflective Processing

In categorical thinking people establish meaning by automatically integrating incoming stimuli based on existing cultural and private models. When categorical thinking is applied it leads to consistent and predictable outcomes. Thus, this type of thinking is associated with ‘cognitive conservatism’ (Hoch and Deighton, 1989). From a neurocognitive research perspective, categorical processing becomes anchored in neurological pathways and thus is less susceptible to (or even resists) updating (Hogg and McGarty, 1990; Peracchio and Tybout, 1996; Wiley and Alexander, 1987). Most automated and categorical thinking initially emerged from reflective processing but was later relegated to the back of the mind when mastered, freeing up a person’s limited cognitive capacity to monitor discrepant environmental feedback.

Research in social cognition suggests that the applicability of categorical thinking depends on several epistemic factors. For instance, people tend to rely on categorical thinking during everyday routines, when they suffer high cognitive loads, are under pressure for quick decisions, have limited cognitive capacity, and/or are distracted. Categorical thinking leads to more efficient processing of regular socio-cultural interactions and stimuli. The consequence of relying entirely on categorical thinking is that environmental stimuli are ‘forced’ into existing mental models, preventing (or slowing) the person from adjusting to divergent inputs and unusual circumstances.

Conversely, by reflective processing we understand the ability of persons to sustain a high level of cognitive responsiveness and combine/extend internalized cultural and private models in thoughtful (creative, reasoned) ways to improve their sense making. Obviously, the degree of categorical versus reflective thinking varies across situational contexts and according to people’s life experience and general acumen (Hong et al., 2000; Macrae and Bodenhausen, 2000). In reflective thinking, cultural and private models are applied in non-automatic fashions. Reflective thinking is a proactive process.
that occurs when a person has the cognitive capacity and need for deliberate cognition to engage with stimuli that are not easily or usefully made sense of by a categorical application of private and/or cultural models. Category-inconsistent information may trigger reflective thought processes among some people through which they recombine cultural and private models in deliberate ways to improve the relevance of their sense making of a particular situation (Bodenhausen and Garst, 1998; Wegner and Pennebaker, 1993; Wilson and Sperber, 2004). Obviously, if unexpected environmental feedback is continuously ignored and only addressed by suboptimal categorical thinking, it would lead to potentially precarious situations. For example, evidence from managerial decision making illustrates how categorical thinking may lead to a narrowing of perspectives and insensitivity to challenges from unexpected directions (Day and Nedungadi, 1994). Cognitive psychological research suggests that reflective processing may vary based on people’s inherent need and ability to cognize (Bodenhausen and Garst, 1998; Haugtvedt et al., 1992). That is, some people may experience fear and discomfort, and thus avoid updating, when faced with category-inconsistent information, whereas others may be inclined to question and reflect and update their categorical thinking.

The success of knowledge transfer obviously relies on receivers’ ability to apply relevant mental (cultural and private) models and decide when such are deemed suboptimal, triggering reflective thinking. As a person applies reflective processing and it leads to a successful outcome, a recombination of existing and/or new mental models is likely to occur and serve as categorical sensemaking of similar instances in the future. Somewhat paralleling this perspective is the early works of Piaget (1977), in which he suggests that cognition is both open, in the sense that it undergoes exchanges with the environment, and closed, in that it undergoes epistemic cycles of development that are highly reflective and take place largely within the mind and are independent of external sensory input. Vygotsky (1987) addresses this issue in his work on the ‘zone of proximal development’, which investigates the twilight zone between what a learner can achieve through independent problem-solving and what he or she can accomplish using available socio-cultural feedback mechanisms (i.e. dialogue, mentoring, and teaching).

The socio-cognitive approach extends these theories by incorporating cultural and private models into the categorical and reflective processing equation. This means that apart from extreme situations, most of the time a cognitive system is neither fully closed nor open, neither fully determined nor independent of external sensory inputs, and people are neither autonomous processors nor cultural dopes. Hence, knowledge transfer outcomes are typically located somewhere on the scale between fully automatic and fully idiosyncratic, again depending on people’s private and cultural models, level of categorical/reflective thinking, and environmental feedback mechanisms.

**Knowledge Transfer and Outcomes**

Traditional social constructionist models assume that shared practice, experience, and training lead to a shared social reality, within which knowledge transfer is largely automatic and detached from the reflective intersection of the person. In contrast, we suggest that the interaction between reflective/categorical thinking and level of environmental feedback (e.g. from social interaction, practice, media, literature) makes knowledge
transfer a much more complex phenomenon. Although category-inconsistent feedback from the environment may lead to adjustment in existing mental models it is equally plausible that such inputs are incorporated into existing mental structures. Conversely, even well honed and shared routines may be understood differently across participants (Garud and Rappa, 1994). The socio-cognitive approach enables researchers to account for these varied interaction scenarios which at their extreme lead to four very different knowledge transfer outcomes (i.e. negotiated, collective, unique, and stereotypical knowledge). These four different knowledge transfer outcomes appear under Cognitive Outcomes in Figure 1. We provide a graphical overview of them in Figure 2 and elaborate on them further below.

**Negotiated knowledge.** In the negotiated knowledge scenario knowledge transfer is accomplished through an ongoing effort between participants, who are both aware of their conceptual discrepancies and interested in resolving them. The discrepancies emerge from participants’ reliance on divergent mental models. Such barriers to knowledge transfer typically exist in organizations that involve interaction across disciplines and specializations where each representative brings to the table tacit assumptions that need to be made transparent and aligned (through reflective negotiation) in order to reach mutual comprehension and coordination. Depending on the scope of the task and number of people involved, such modes may eventually become shared within a larger group (and as such emerge as shared organizational cultural models).

An illustrative example of the negotiated knowledge scenario is presented by Schön (1983) in which he describes how the interaction between a client and a consultant
continued to face pitfalls because the consultant belonged to a thought community that differed from his client (see also Nikolova, 2007). Schön (1983) argues that the client–consultant interaction may be improved if consultants continuously reflect upon their assumptions and judgments and interact with their clients through reflective conversations. This can be readily applied to improve knowledge transfer within organizations where increased reflection on one’s own as well the other’s conceptual models (i.e. assumptions) can be exposed and aligned. Schön (1983) calls this ‘reflection-in-action’ during which both clients and consultants share authority and control over the negotiated knowledge outcome. Schön’s (1983) reflective conversations illustrate key features of this type of knowledge transfer scenario.

Collective knowledge. The collective knowledge scenario assumes that practitioners involved in knowledge transfer rely on scripted and shared cultural models emerging from widely shared experience, education, and training (Bourdieu and Wacquant, 1992). As was the case in negotiated knowledge, the collective knowledge scenario involves a high degree of ongoing social interaction. However, within collective knowledge people rely on more automated categorical thinking. Here, knowledge transfer occurs without problems due to the high degree of shared background knowledge (stemming from ongoing social interaction as well). Categorical thinking often emerges among people involved in repeated routines. This type of task is more mechanical and procedural in nature. For example, Mintzberg (1979, pp. 6–7) illustrates how communication between an anaesthesiologist and a surgeon in the operating room takes place with few explicit signs. They work and relate to a set of shared cultural models that help them make sense of each other’s actions, reach similar conclusions at similar times, and rely on limited gestures and exchanges of words to communicate. This type of knowledge transfer is required for organizations that rely heavily on the coordination of tasks in a predictable fashion across time, such as between surgeon assistants and surgeons, fighter pilots and groundcrew, and among fire fighters. Intense and ongoing professional training enable some degree of reliance on similar cultural models among participating members of a community (enabling them to know when, why, and what to expect from others). This ensures effective communication within the collective boundary but has potential for serious problems in knowledge transfer across these boundaries as Dougherty’s (1992) research illustrates. Following McDougall (1920, pp. 69–70), the creation of collective meaning is more likely in organized groups where individuals share a degree of continuity of existence and identity and where a body of common traditions, customs and habits are developed.

Of course, collective knowledge has the drawback of hindering communication among individuals who belong to different groups. It also discourages unique processing and responses to events beyond and above how the group typically react. As Weick (1993) illustrates, collective thinking was likely a contributing factor to the Mann Gulch fire disaster in Montana, in which 13 firefighters succumbed to flames. In this disaster, firefighters were unable to negotiate the strangeness of the situation, which simply did not conform to the highly scripted and shared cultural models on which they relied, leaving them short of alternative approaches to collectively address highly unusual circumstances (Weick, 1993, p. 645).
Unique knowledge. The third knowledge transfer scenario is defined by very limited social interaction (i.e. social isolation) and high level of reflective thinking. In its extremes, this scenario represents people who, due to either choice (e.g. lack interest in socializing) and/or circumstances (e.g. time constraints, difficulties socializing, job specifications, language differences) end up relying on unique combinations of symbolic meaning structures (i.e. private and cultural models) that differ from mainstream accepted categories and norms. These persons are understood by few others and often live in conceptual worlds of their own making, in some ways, representing an emancipated postmodernist at work. Such persons may be considered socially inept, extreme idealists, or even nerds.

Most knowledge transfer is restricted and incidental to the occasional sharing of cultural models among highly reflective but largely non-socially attuned thinking. Still, it is difficult to envision a person with this predisposition functioning in any type of organizational settings. However, people with less extreme dispositions (i.e. more socially grounded and only some degree of conceptual eccentricity) may possibly be used as creative inspiration within organizations. These people may be productively tapped for their unique ideas by more socially attuned managers. For example, ad agencies may benefit from people who think ‘off the wall’ and produce highly unusual ideas. Others may apply these ideas in a productive and socially relevant manner in ad campaigns and/or product developments.

Interestingly, organizational communication channels may inadvertently create contexts that disassociate concepts from their original contexts. For example, Reihlen and Ringberg (2006) show, in an empirical study on computer-mediated knowledge system in an international consultancy firm (that was installed based on the positivist assumption that knowledge can easily be codified and stored), that consultants experienced huge difficulties deciphering the intended categorical meaning of encoded information. The more reflective consultants instead cherry picked ideas and used them independently of their originally intended purpose to address unrelated needs.

Stereotypical knowledge. The fourth scenario is stereotypical meaning, which refers to knowledge transfer settings in which people rely on categorical thinking in an automatic, unreflective fashion. This typically happens in highly routine-based and formalized scenarios where specific behavioural expectations are oriented by fixed rules of signification and action (Luhmann, 1964; Sutcliffe and McNamara, 2001). Bureaucratic organizations, for instance, tend to actively instil routines (i.e. sub-cultural models) that discourage private models and reflective application. Such rote behaviour may be accomplished without full (i.e. reflective) attention or comprehension and is highly scripted, ensuring its consistent application (across context and time) without much monitoring (i.e. low social interaction). Within some organizations stereotypical meaning may be useful when dealing with highly institutionalized and habitual practices/routines that are implemented in a repetitive manner without supervision.

Tellingly, even among upper-level management, well-formed and homogenous mental models can cause judgment to deviate systemically from rationality. Such biases or blind spots lead to overconfidence in judgment and non-rational escalation of commitment, a problem of framing at the expense of inability to perceive alternative problem
formulations (see Ginsberg, 1994, p. 157). With little updating (i.e. little social interaction) and a highly structured environment these managers are bound to repetitively rely on outmoded cultural models. Dutton (1993), for instance, argues that under specific conditions some decision-makers apply categorical thinking to understand multifaceted strategic issues, thereby imposing a simplistic and outdated perspective that may lead to myopic vision, ignorance, and arrogance (see also Ashmos et al., 1998). Such management practices lead to a static vision of the world, where information either fits into a preconceived framework or is entirely overlooked. Argyris’s (1990) account of the Challenger space shuttle disaster illustrates the potential detriments of a decentralized organization (i.e. little social interaction) with entities operating according to highly scripted routines, leading to stereotypical interpretation. Argyris (1990) argues that the tragedy was caused largely by upper-level NASA managers, who believed that organizational practices served as catalysts for the smooth multilevel knowledge transfer and safe operation of this project. The reliance on practices as meaning carriers became detrimental to a successful outcome of this operation. Instead, bureaucratic processes motivated by stereotypical knowledge and desire to stick to the rules, even in the face of contradictory feedback contributed to this disaster.

**DISCUSSION**

The assumption that knowledge transfer processes are anchored in objectified texts and protocols (i.e. positivist), and/or disembodied, institutionalized practices, discourses and so forth (social constructionist) only captures situations within which people rely on highly stable and uniformly internalized cultural models. The latter is captured by our socio-cognitive model under stereotypical meaning (categorical reliance on cultural models) described above. In summing up, the socio-cognitive model (1) provides a more nuanced understanding of the role of private and cultural models as they are engaged by categorical and/or reflective thinking, and (2) accounts for a range of knowledge transfer (meaning) outcomes, currently only partially accounted for. The socio-cognitive approach broadens traditional positivist and social constructionist positions by situating sense making within the mind (and body) that may be influenced but rarely determined by environmental feedback mechanisms (Bandura, 1986; Bunge, 1996).

Although other recent research streams cover important grounds related to cognition and social processes (e.g. Feldman and Pentland, 2003; Garud and Rappa, 1994; Levinthal and Rerup, 2006; Weick et al., 1999) the socio-cognitive approach provides a comprehensive theoretical framework that explains knowledge transfer within and across organizations in relation to the interplay between personal and cultural resources (private and cultural models), need for cognition (reflective and/or categorical), and level of social interaction.

It should be obvious that ‘there clearly cannot be a cognitive productive community where people do not understand one another’ (Rescher, 1998, p. 13), yet exactly how much and what needs to be understood varies within and across organizational contexts and level of knowledge transfer required. It is likely that all four types of knowledge transfer (meaning outcome) scenarios co-exist to various degrees and at various organizational levels, and that a person may even participate in more than one scenario based
on various organizational roles and tasks. The different assumptions underlying the positivist, social constructivist, and socio-cognitive approaches are highlighted in Table I.

The socio-cognitive approach offers one possible explanation for why disembodied knowledge transfer (i.e. positivism and social constructionism) remains provisional in terms of explaining both the type of knowledge transferred (i.e. meaning outcomes) and the cognitive processes involved (private/cultural models, reflective/categorical thinking). The socio-cognitive model provides a more comprehensive and systemic understanding of the roles of cognitive factors and environmental feedback mechanisms. Whether organizations will benefit from overly dogmatic and homogenizing processes or creative and heterogeneous ones likely depends on the situation, the people involved, and the complexity of the required knowledge transfer. It is up to future research to match optimal knowledge transfer scenarios with certain organizational functions and tasks.

MANAGERIAL IMPLICATIONS

The managerial challenge for practitioners is to improve knowledge transfer within and across organizational units, yet such improvements require that managers proactively match knowledge transfer scenarios with the type of outcome that corresponds to organizational requirements. A key challenge for managers in knowledge-based companies is to anticipate the continual meaning (and thus knowledge) ‘slippage’ as well as improvement of knowledge as it flows through people within an organization. Assessing such slippage and changes require that managers become more attuned to identify employees’ (as well as clients’ and consumers’) interpretive frameworks and match these with the desired knowledge transfer scenario.

To match knowledge transfer processes with desired meaning outcomes, managers need to be trained to identify and coordinate people’s cognitive dispositions (reflective, categorical) and required level of social interaction (i.e. updating) with the type (level, complexity) of knowledge transfer that is required for an efficient operation under a given environmental condition. For example, a high degree of social interaction and team building across organizational units may be counterproductive if the main desire is to create original ideas. Yet, as other research has shown, such interaction may be useful if engineering and production personnel are to collaborate on product development (see Clark and Fujimoto, 1991).

Although such skill-sets are not part of current management hiring criteria, knowledge-based companies that are able to successfully incorporate different scenarios and interactional outcomes in knowledge transfer (represented in Figures 1 and 2) may gain a competitive advantage and optimize their resources. Knowledge-based organizations therefore should instil procedures for sensitizing managers to the identification of knowledge workers’ conceptual frameworks. Such procedures are not dissimilar to those adopted by sales departments, in which salespeople are trained to take the perspective of the customer or collaborator and optimize their services by adapting their responses dynamically to the personalities, needs, and presuppositions of their clients (e.g. Brookesbank, 1995; Weitz et al., 1986).
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<th>Knowledge as:</th>
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Lambert et al. (1990) empirically show that the amount of training personnel receive relates positively to a heightened introspection (understanding of one’s own presuppositions) and extrospection (understanding of a sender’s presuppositions – mental models). Such heightened intro-/extrospection may enable a better matching of communicating parties within the sense making matrix. It may also enable managers to identify ‘hidden’ obstacles and prevent slippage of knowledge within an organization.

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NOTES

[1] Bechky (2003, p. 328) recognizes this implication when noting that similarity in context (i.e. training) likely allows for the easier creation of a common ground.

[2] Although cognition is a central part of the socio-cognitive approach, it differs radically from the cognitivist perspective as the latter assumes the world to be pre-given, that information is a commodity, and that processing is rule-based (Varela et al., 1992).

[3] It should be noted that reflective and categorical thinking does not map neatly upon explicit and tacit thought processes. The explicit/tacit dichotomy represents an analytical abstraction that at once simplifies and obscures the complex interaction between mental models and thought processing. For example, to map tacit processing upon categorical thinking is to overlook that categorical thinking consists of both private and cultural models which may be scrutinized reflectively if the gap between incoming information and such models is too wide. This distinction serves as an interesting future research topic.

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