

**Towards a conceptual framework for exploring how individuals within organisations
share practical knowledge**

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ABSTRACT

Practical knowledge is key to the success of most organisations, because as part of intellectual capital, it can contribute to sustained competitive advantage. In a context of an aging workforce in many countries, the sharing of practical knowledge is therefore critical prior to the departure of skilled older workers. However, this area remains under-researched. Informed by the literature, this paper therefore develops a conceptual framework of the practical knowledge sharing process. Using the developed conceptual framework is argued to assist researchers in two ways: (1) providing an insight about what to look for during the research and (2) providing an insight into categorising the collected data.

Keywords: Knowledge Transfer; Knowledge Management; Individual Learning; Organisational Learning; Transformation.

The concept of practical knowledge and how it is shared has gained the attention of many scholars from many disciplines that include but not limited to the following: education, knowledge management, organisational learning and workplace learning. Although there is increasing interest in understanding knowledge and how it is successfully shared, a review of literature related to practical knowledge sharing revealed a number of gaps. First, the literature on practical knowledge sharing lacks agreement on how to represent the sharing process, what stages it involves, and identifying the focal point of the sharing process. Second, there is a call for research to be undertaken on the inter-relationship between practical knowledge types and knowledge sharing mechanisms (Boh 2007; Bou-Llusar & Segarra-Cipres 2006; Guzman 2008, 2009). Third, there is a lack of consistency in recognising the important role of reflection within the sharing process of practical knowledge. Fourth, the reviewed literature overlooks the significant role of situation awareness within the process of practical knowledge sharing.

Based on this recognised gap in understanding the process of practical knowledge sharing, the objective of this paper is to develop a conceptual framework informed by the literature. The rationale for developing such a framework is the need to empirically explore this under-researched area. Further, the developed conceptual framework will act as a guide for researchers conducting future research.

The paper will be organised in the following way. At the start, practical knowledge is defined. After that, the meaning of practical knowledge sharing is highlighted, plus the rationale as to why there is a need to further explore how the sharing process occurs. Then, through a review of relevant practical knowledge sharing models (Argyris & Schon 1974; Carlile & Rebentisch 2003; Gherardi 2006; Jarvinen & Poikela 2001; Kolb 1984; Orlikowski 2002; Raelin 1997), a conceptual framework of how practical knowledge sharing occurs is developed. The paper concludes with arguments about effective methods to conduct research in this area, as well as the potential significance of such research.

PRACTICAL KNOWLEDGE

Practical knowledge is defined as the ability (both cognitive and practice-based) of an actor to employ previously acquired knowledge in a specific context that demonstrates the understanding to achieve set objectives (Guzman 2009). To distinguish practical knowledge from other types of knowledge, practical knowledge is characterised as being personal, embodied, situated, possessing semantic aspects, and relational, as well as being constituted by two inseparable multi-dimensions (tacitness and embodiment dimensions) (Guzman, 2009). Building on the work of Guzman (2009), the combination of these inseparable multi-dimensions results in four major types of practical knowledge: explicit, tacit, intellectual and automated. Explicit practical knowledge refers to practice that is associated with the explicit component of procedural knowledge (know-how). Tacit practical knowledge refers to practices that depend on the tacit component of procedural knowledge (knowing). Intellectual practical knowledge refers to practices that are embedded within the intellect of the knowing individual and mainly involves overt actions. An important feature of this type is that it overcomes the influence of physical actions or practice dimension of practical knowledge. Automated practical knowledge refers to practices that overcome the influence of the intellectual or cognitive influence over the practice.

THE NEED TO EXPLORE HOW PRACTICAL KNOWLEDGE SHARING OCCURS

Practical knowledge sharing is viewed as a socialisation process where individuals mutually exchange knowledge (explicit and tacit) and jointly create new knowledge (van den Hooff & de Ridder 2004; van den Hooff & Huysman 2009). Actors within the practical knowledge sharing process attempt to

“alter current knowledge, create new knowledge and validate it” (Carlile 2002: 445). In this paper, as the literature on practical knowledge sharing are multi-disciplinary the terms sharing and learning will be used interchangeably.

A review of the models most relevant to a practice based view of knowledge (Argyris & Schon 1974; Carlile & Rebentisch 2003; Gherardi 2006; Jarvinen & Poikela 2001; Kolb 1984; Orlikowski 2002; Raelin 1997) reveals a number of contributions and shortcomings. On the positive side, the relevant literature agrees in representing the sharing process of practical knowledge as a cyclic process that involves ongoing interaction between actors. Another contribution of the literature is the identification of the important role of feedback or reflection to the learning process (Argyris & Schon 1974; Carlile & Rebentisch 2003; Jarvinen & Poikela 2001; Kolb 1984). Furthermore, the literature also acknowledges the important role of the initial stage of the process that aims to prepare the individuals for the sharing process, which has been referred to as identity sharing (Orlikowski 2002), conceptualisation (Raelin 1997) or knowing the context (Gherardi 2006).

On the negative side, a review of the models (Argyris & Schon 1974; Carlile & Rebentisch 2003; Gherardi 2006; Jarvinen & Poikela 2001; Kolb 1984; Orlikowski 2002; Raelin 1997) reveals a number of shortcomings. First, the reviewed models lack consistency in identifying the stages that constitutes the process of practical knowledge sharing. For example, while some consider the sharing process as a three stage process (Carlile & Rebentisch 2003), which includes storage, retrieval and transformation, others view the process as a four stage process (Jarvinen & Poikela 2001; Raelin 1997), which includes conceptualisation, experimentation, reflection and experience. A major difference between these models is their identification of the focal point of the learning or sharing process. For example, the early popular work of Kolb (1984) considers experience as the focal point of the learning process, which is similar to the stand point of both Jarvinen and Poikela (2001) and Carlile and Rebentisch (2003). However, Raelin (1997) posits that conceptualising the learning process, prior to conducting it, is the starting point of the learning process. Yet, Argyris and Shon (1974), consider that the learning process is controlled by what is referred to as the governing variables of the process. That is, the basic values that individuals always seem to strive to satisfy and that govern their behaviour during the learning process (Argyris 1977). Hence, learner’s formed governing variables prior to the learning

process control the outcome of that learning process. These differences in representing the stages and focal stage of the sharing process, portray the need to further explore the practical knowledge sharing process. Indeed, the literature calls for further exploration of how the process occurs (Bou-Llugar & Segarra-Cipres 2006, Carlile & Rebentisch 2003; Kalling 2003; Goh 2002; Guzman 2008; Mooradian, Renz & Matzler 2006), especially to provide more details of the stages that constitute the practical knowledge sharing process.

Second, the models reviewed lack attention to the mechanisms involved in sharing different types of practical knowledge. These sharing mechanisms refer to the means used to share practical knowledge, such as personal movement, face-to-face meetings, observation, documentation and many others (Argote, Ingram, Levine & Moreland 2000; Kakabadse, Kakabadse & Kouzmin 2003; Nonaka 1991). According to Boh (2007), these mechanisms can be grouped into four categories: formal-codified, formal-personalised, informal-codified, or informal-personalised mechanisms. The current models do not provide enough details on the suitability of the different mechanisms used to share different types of practical knowledge. For example, although Orlikowski (2002) acknowledges that the process of sharing practical knowledge involves a stage that is referred to as 'learning by doing', Orlikowski neither details how this stage is conducted, nor indicates the suitability of different mechanisms for sharing different types of practical knowledge. This omission indicates the need to further study the mechanisms employed in the sharing process, as limited empirical research is found investigating this issue (Boh 2007; Chai, Gregory & Shai 2003; Darr, Argote & Epple 1995).

Another example is present in Argyris and Shon (1974) model. Although they acknowledge that actors in the learning process should go through a series of actions until a match is reached between the desired outcome and actual outcome, Argyris and Shon did not focus on the mechanisms associated with the learning process and action stage of the process. This need is also raised, as present research identifying the influence of practical knowledge types over different sharing mechanisms within the sharing process is based on theoretical grounds (Bou-Llugar & Segarra-Cipres 2006; Szulanski 1996). Hence, there is a need for more empirical studies to strengthen these theoretical arguments. More specifically, there is a need to further explore the role of practical knowledge types in identifying the suitable sharing mechanisms within the practical knowledge sharing process.

Third, the reviewed models lack consistency in recognising the important role of reflection within the sharing process of practical knowledge. While some literature acknowledges reflection as an important stage of the practical knowledge sharing process (Argyris & Schon 1974; Gheradi 2006; Jarvinen & Poikela 2001; Kolb 1984; Raelin 1997), for others reflection is not considered (Carlile & Rebentisch 2003; Orlikowski 2002). Consequently, there is a need to further explore the role of reflection in the practical knowledge sharing process, which is acknowledged in recent research (Mann, Gordon & MacLeod 2009). Reflection is considered important in the sharing process of practical knowledge, as individuals' reflections on the sharing process encourage individuals to think about their performed actions and to generate alternative actions to achieve the intended objectives. In other words, reflection is an individual process that aims to achieve understanding through purposeful analysis of the object on hand (Mann et al. 2009).

Furthermore, research related to the concept of reflection indicates that situation awareness, or being aware of the context that bounds the sharing process, is significant to the practical knowledge sharing process (Endsley 2006; Korthagon 2004; Korthagon & Vasalos 2005). The concept of situated awareness has been defined as "the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning and the projection of their status in the near future" (Endsley 2006: 634). The important role of being aware of the context is also acknowledged in the literature of practical knowledge sharing (Jarvinen & Poikela 2001; Gherardi 2006). In other words, the individuals' sharing of practical knowledge develops when the individual has strong awareness of the contextual aspects that bounds the sharing process. However, the reviewed models lack linking between both the role of reflection and situation awareness along with the mechanisms used within the process of practical knowledge sharing, which is the fourth and final shortcoming of the reviewed models. Therefore, there is a need for further research to further clarify this area.

In summary, these identified shortcomings and the contribution of the reviewed practical knowledge sharing models are presented in Table 1. Building on the current reviewed models, this paper therefore aims to develop a conceptual framework of the practical knowledge sharing process. The contribution of this paper is to advance the current understanding of the sharing process and overcome some of the shortcomings identified within current practical knowledge sharing body of literature.

(Inset Table 1 here)

In an attempt to address some of the identified shortcomings of the reviewed practical knowledge sharing models, the following section demonstrates the development of a conceptual framework of practical knowledge sharing. The discussion attempts to link the framework with the addressed research needs, aiming to provide an insight about what occurs in practice. This conceptual framework is argued to guide future researchers in this area in two ways: (1) providing an insight about what to look for during the research and (2) providing an insight into categorising the collected data to relevant aspects of the sharing process.

Prior to explaining the proposed conceptual framework, future researchers attempting to use this framework have to be aware of the following. Individuals sharing different types of practical knowledge in real time might follow the proposed framework and might not. Indeed, prior research in this area indicates that different learners when learning different types of knowledge may have a different starting point within the learning process (Kolb 1984). Furthermore, empirical research critiquing Kolb's popular experiential learning model, indicates that individuals in different learning experiments follow different stages when learning different types of knowledge as well as that the use of all stages of the learning process is not essential (Jarvis 1987). Therefore, the proposed sequence of the identified stages, within the proposed conceptual framework, does not imply essentiality (that one stage should occur before the other) nor does it suggest that a learner has to go through all proposed stages when sharing different types of practical knowledge. Indeed, not being open to such considerations might result in modelling reduction or over-simplification trap that some researchers un-purposefully might fall into, which is against the primary purpose of such processual research that is to provide a rich representation of what occurs in practice (Jarvis 1987; Langley 2009).

Importantly, while the proposed conceptual framework attempts to explain the overall aspects associated with the sharing process of practical knowledge, achieving a rich representation of what occurs in practice requires a number of studies that each should focus on a limited number of issues at a time. Combining and integrating the results of these studies is argued to assist future researchers in achieving the intended objective of such processual research, which requires long period of time to be achieved (Langley 2009).

TOWARDS A CONCEPTUAL FRAMEWORK OF SHARING PRACTICAL KNOWLEDGE

Making sense of the reviewed models (Argyris & Schön 1974; Carlile & Rebutisch 2003; Gherardi 2006; Jarvinen & Poikela 2001; Kolb 1984; Orlikowski 2002; Raelin 1997) is the basis for constructing a conceptual framework of the practical knowledge sharing process that consolidates and expands the strengths and overcome some of the weaknesses of these models. A departure point for developing a conceptual framework of practical knowledge sharing process is the work of Argyris and Schön (1974). According to them, the learning process starts with a governing variables, which are then followed by a series of actions and reflection loops that respond to the consequences of actions, until a match is reached. Integrating the work of Argyris and Schön (1974), along with other models, four stages that constitute the process of practical knowledge sharing to be adopted in the framework are identified: *initiation*, *experimentation*, *reflection*, and *assurance*. Figure 1 demonstrates the proposed conceptual framework.

(Inset Figure1 here)

The first stage of the practical knowledge sharing process, the *initiation* stage, is also acknowledged in other models as it is referred to as the governing variables (Argyris & Schön 1974), conceptualisation (Raelin 1997), concrete experience (Jarvinen and Poikela 2001), and storage (Carlile & Rebutisch 2003). The stage aims to prepare the actor, in the sharing process, to become *familiar* with the context and the unspoken rules that assist in forming the internal or external *governing variables* that will guide the actors' *conceptualisation* of the sharing process before it starts (see Figure 1).

Importantly, the reviewed literature provides insights about the empirically used means to assist individuals (learners or employees) reaching the desired objective of the *initiation* stage. According to Gherardi (2006) making sense of the practice (associated with the practical knowledge to be shared) involves ongoing watching, looking, seeing and listening to other employees as they carry out the practice, which allow individuals to learn who knows what, what factors are declared, as well as what factors are silenced and why (referred to as "knowledge pointer"). Also, talks in, and about, the practice (associated with the practical knowledge to be shared) can be initiated. Through actively making sense of as well as negotiating these talks, individual's learning experience are argued to be

enhanced (Gherardi 2006). Moreover, these talks, negotiations, and listening means of becoming familiar with the context, which are referred to by Orlikowski (2002) as face to face practices, also contribute towards organisation's employees' effort to becoming familiar with each other. Indeed, this familiarity increases relationships' ties between employees that are argued to contribute positively to the facilitation of learning between organisation's employees (Orlikowski, 2002). Although these studies provide insights about the means used to assist achieving the desired familiarity objective of this stage, further research is required specifically to explore other empirically used means as well as exploring whether different types of practical knowledge require different means to achieve the desired familiarity objective of the initiation stage.

The second stage of this process, *experimentation*, acknowledged by Raeling (1997), is also referred to in other models as the 'learning by doing' stage (Orlikowski 2002), the active experimentation stage (Jarvinen & Poikela 2001; Kolb 1984) and the transformation stage (Carlile & Reberich 2003). For the developed framework, this stage involves taking actions aimed at achieving an intended outcome and responding to the consequences of these actions. Such actions are guided by the governing variables formed throughout the initiation stage. During this process individuals will perform actions to learn that knowledge through utilising different sharing mechanisms (means used to share practical knowledge), which might differ when sharing different types of practical knowledge. For example, are the mechanisms used to share automatic practical knowledge similar to the mechanisms used to share tacit practical knowledge?

Importantly, the argument that states the influence of practical knowledge types over the use of different sharing mechanisms, has gained only limited empirical attention (Boh 2007; Chai et al. 2003). Nevertheless, these limited empirical studies, focusing on the sharing mechanisms used to share different types of knowledge, provide insights about the types of these sharing mechanisms as well as insights about the suitability of these different types of sharing mechanisms to share different types of knowledge. For example, Boh (2007) argues that the sharing mechanisms that involve personal interaction are suitable for sharing the tacit dimension of knowledge and the codified sharing mechanisms are suitable for sharing the explicit dimension of knowledge. Although these studies provide insights about the suitable sharing mechanisms to share the tacit and explicit dimensions of

knowledge, these studies do not provide insights about the other dimensions considered in this paper that include both the practice and intellectual dimensions of practical knowledge. Also, these studies do not indicate if these sharing mechanisms types are empirically used in isolation or combination, hence whether these types of mechanisms complement one another or not. Indeed, the clear cut (within the limited empirical studies that argue the suitability of using personalised sharing mechanisms to share tacit dimension of knowledge and codified sharing mechanisms to share explicit dimensions of knowledge) is challenged as different types of practical knowledge in this paper involve some level of action that is embedded and situated. Thus, to enhance the sharing of different types of practical knowledge, a mixture of different types of sharing mechanisms is argued being suitable. Therefore, further research is required specifically to explore the role of practical knowledge types (or dimensions) when identifying suitable sharing mechanisms within the sharing process of practical knowledge (see Figure 1).

The third stage of this process, *reflection*, is also acknowledged by a number of scholars (Gherardi 2006; Jarvinen & Poikela 2001; Raelin 1997). The literature on both the concept of reflection and its models is substantial. In an effort to categorise the reflection models, Mann et al. (2009) argued that the available reflection models can be categorised into two major groups: (1) scholars who view reflection as multiple levels (eg. Mazirow, 1991); and (2) scholars who view reflection as a process (eg. Schön, 1983). A complementary and integrative approach to view reflection from both process and level perspectives is argued to contribute to individual's learning (Korthagon & Vasalos 2005). Combining the work of Schön (1983) on reflection with the current developed framework, it appears that reflection not only occurs after action as indicated by Argyris and Schön (1974), but it also occurs within action. These two reflection states are referred to as reflection-in-action and reflection-on-action (Schön 1983). In addition to the two reflection states (in-action and on-action), reflection before-action is also perceived as being crucial to the learning process as this state of reflection "involves thinking through what one wants to do and how one intends to do it before one actually does it" (Greenwood 1998: 1049). Hence, for the purpose of this paper three reflection points will be included in the framework. As a consequence an actor can reflect within the process, which may occur prior or after executing actions and prior to achieving the results (see Figure 1). Importantly, as the

literature on how to conduct reflection within the learning process is substantial, future research that specifically focus on the role of these different reflection states (or points) in influencing individuals' selection of suitable sharing mechanisms to share different types of practical knowledge is needed, as this area is argued to be under-researched.

Furthermore, although the literature acknowledges the importance of reflection in the sharing process, the reviewed models do not emphasise the relationship between reflection and situation awareness, and the experimentation stage of the process. According to the work of Korthagon and Vasalos (2005), the systematic application of reflection assists reflectors in their professional learning. This systematic approach of reflection according to Korthagon (1985), follows a five stage process that aims to reflect on the executed actions that have failed to achieve the intended objectives, aiming to generate alternative actions (which could include the use of alternative sharing mechanisms), which is influenced by the reflector's awareness of the essential aspects of the process. It is argued that this awareness is developed in three levels: perception forming, comprehension developing, and projection making (Ensley 2006). Keeping the objective of reflection in mind, namely to generate alternative actions to achieve intended objectives, limited research has linked the role of situation awareness and reflection within the practical knowledge sharing process. More specifically, limited research has explored the role of reflection and situation awareness in identifying the suitable sharing mechanisms within the sharing process (see Figure 1).

The final stage of this process is the *assurance* stage. Argyris and Schön (1974), argue that learning is achieved when matching or mismatching result is reached. However, the current paper posits that learning will occur in those cases that result in achieving repeated matches. Hence, there is a need to repeat the actions taken to achieve the same results, so that learning can be accomplished and confirmed. The role of repetition in learning has been acknowledged in prior research and more specifically in the field of education (e.g. Dahlin & Watkins 2000) and psychology (e.g. Rock 1957). It is believed that integrating the role of repetition into the sharing process of practical knowledge will contribute to the practical representation of the proposed practical knowledge sharing framework (see Figure 1).

CONCLUSION

A review of the practical knowledge sharing literature, revealed the need for further exploration of how practical knowledge is shared. In this paper, practical knowledge has been characterised as being personal, embodied, situated, possessing semantic aspects, and relational, as well as being constituted by two inseparable multi-dimensions (tacitness and embodiment dimensions) (Guzman 2009). Indeed, the process of practical knowledge sharing has been viewed as a cyclic dynamic process that is constituted by multiple stages that are referred to using different terminologies (Argyris & Schön 1974; Carlile & Reberich 2003; Gherardi 2006; Kolb 1984; Orlikowski 2002; Raelin 1997).

Although this research area has gained the attention of many scholars (Argyris & Schön 1974; Carlile & Reberich 2003; Gherardi 2006; Jarvinen & Poikela 2001; Kolb 1984; Orlikowski 2002; Raelin 1997), there is, nevertheless, a need to further investigate the elements that constitute this process, especially as most of the available models provide a holistic representation that lacks detail and a thorough representation of what happens within each of these identified stages (Bou-Lluisar & Segarra-Cipres 2006; Carlile & Reberich 2003; Goh 2002; Guzman 2008; Kalling 2003; Mooradian et al. 2006). Additionally, a more specific need exists for research that involves the exploration of the mechanisms suitable for sharing the different types of practical knowledge (Boh 2007; Chai et al. 2000; Darr et al. 1995; Guzman 2008, 2009). Furthermore, while some literature acknowledges reflection as an important stage of the practical knowledge sharing process (Argyris & Schon 1974; Gherardi 2006; Jarvinen & Poikela 2001; Kolb 1984; Raelin 1997), for others reflection is not considered (Carlile & Reberich 2003; Orlikowski 2002). Consequently, there is a need to further explore the role of reflection in the practical knowledge sharing process, which is acknowledged in recent research (Mann et al. 2009). Therefore, this paper explores the literature on how individuals share practical knowledge within organisations.

The outcome from this critical review of the literature is a conceptual framework of how this sharing process occurs, which has been presented and explained as a cyclic process that is constituted by four stages: initiation, experimentation, reflection and assurance. The conceptual framework of practical knowledge sharing developed in this paper, is argued to assist future research in two ways: (1) providing an insight about what to look for and (2) providing an insight into categorising the data to

relevant aspects of the sharing process. Not being familiar with these aspects prior to the start of the research might result in missing some important data related to the sharing process, and hence, lose the opportunity to collect rich informed data. Moreover, as such processual research requires long period of time, it is advisable to break down this proposed research in a number of empirical studies that each should focus on a limited number of issues that were highlighted in the proposed conceptual framework.

However, to further the research within this area, it is suggested that the use of qualitative research design be employed, as qualitative methods are appropriate in the aim to study and provide further details about both the explicit and tacit dimensions of the process of practical knowledge sharing. A qualitative data collection procedure is proposed because in order to fully examine how individuals share practical knowledge, observation of individuals engaged in the actual context under investigation is argued as being critical. While in-depth interviews would support and enhance the understanding of sharing practical knowledge, direct observation is clearly necessary to gain full insight. Observation could be undertaken during the informal interaction with both experts and novices involved in the sharing process of practical knowledge. Observation is also proposed in order to facilitate exploration of the tacit component associated with the application and sharing of practical knowledge.

The potential significance of future research in this area entails unpacking the black box of sharing practical knowledge through providing a detail representation of how each stage within the process occurs (Carlile & Rebentisch 2003). Furthermore, future research in this area will provide researchers and practitioners with an insight about the associated mechanisms suitable to share different types of practical knowledge, as well as an insight into the role of both reflection and situation awareness in the practical knowledge sharing process.

References

- Argote L, Ingram P, Levine JM and Moreland R L (2000) Knowledge transfer in organisations: Learning from the experience of others, *Organisational Behaviour and Human Decision Processes* 82(1): 1-8.
- Argyris C (1977) Double loop learning in organisations, *Harvard Business Review* 55(5): 115-125.
- Argyris C and Schön DA (1974) *Theory in practice: Increasing professional effectiveness*, Jossey-Bass Publishers, San Francisco.
- Boh W (2007) Mechanisms for sharing knowledge in project-based organisations, *Information and Organisation* 17(1): 27-58.
- Bou-Llusar J and Segarra-Cipres M (2006) Strategic knowledge transfer and its implications for competitive advantage: An integrative conceptual framework, *Journal of Knowledge Management* 10(4): 100-112.
- Carlile PR (2002) A pragmatic view of knowledge and boundaries: Boundary objects in new product development, *Organisation Science* 13(4): 442-455.
- Carlile PR and Reberich E (2003) Into the black box: the knowledge transformation cycle, *Management Science* 49(9): 1180-1195.
- Chai K, Gregory M and Shi Y (2003) Bridging islands of knowledge: A framework of knowledge sharing mechanisms, *International Journal of Technology Management* 25(8): 703-727
- Dahlin B and Watkins D (2000) The role of repetition in the processes of memorising and understanding: A comparison of the views of German and Chinese secondary school in Hong Kong, *British Journal of Educational Psychology* 70: 65-84.
- Darr ED, Argote L and Epple D (1995) The acquisition, transfer, and depreciation of knowledge in service organizations: Productivity in franchises, *Management Science* 41(11): 1750-1762.
- Endsley M (2006) Expertise and situation awareness', in Ericsson K A, Charness N, Feltovich P J & Hoffman R R (Eds.), *The Cambridge handbook of expertise and expert performance*, pp. 633-651, Cambridge University Press, Cambridge.
- Gherardi S (2006) *Organisational knowledge: The texture of workplace learning*, Blackwell Publishing, USA.

- Goh CS (2002) Managing effective knowledge transfer: An integrative framework and some practice implications, *Journal of Knowledge Management* 6(1): 23-30.
- Greenwood (1998) The role of reflection in single and double loop learning, *Journal of Advanced Nursing* 27(5): 1048-1053.
- Guzman G (2008) Sharing practical knowledge in hostile environments: A case study, *Journal of Workplace Learning* 20(3): 195-212.
- Guzman G (2009) What is practical knowledge?, *Journal of Knowledge Management* 13(4): 86-98.
- Jarvinen A and Poikela E (2001) Modelling reflective and contextual learning at work, *Journal of Workplace Learning* 13(7/8): 282-290.
- Jarvis P (1987) *Adult learning in the social context*, Croom Helm, NY.
- Kakabadse NK, Kakabadse A and Kouzmin A (2003) Reviewing the knowledge management literature: Towards a taxonomy, *Journal of Knowledge Management* 7(4): 75-91.
- Kalling T (2003) Organisation-internal transfer of knowledge and the role of motivation: A qualitative case study, *Knowledge and Process Management* 10(2): 115-126.
- Kolb D (1984) *Experiential learning: Experience as the source of learning and development*, Prentice-Hall, NJ.
- Korthagen F (1985) Reflective teaching and preservice teacher education in the Netherlands, *Journal of Teacher Education* 36(5): 11-15.
- Korthagen F (2004) In search of the essence of a good teacher: Towards a more holistic approach in teacher education, *Teaching and Teacher Education* 20(1): 77-97.
- Korthagen F and Vasalos A (2005) Levels in reflection: core reflection as a means to enhance professional growth, *Teachers and Teaching Theory and Practice* 11(1): 47-71.
- Langley A (2009) Studying processes in and around organisations, in Buchanan D & Bryman A (Eds.), *The SAGE handbook of organisational research methods*, pp. 409-429, SAGE Publications Ltd, United Kingdom.
- Mann K, Gordon J and MacLeod A (2009) Reflection and reflective practice in health professions education: A systematic review, *Advances in Health Sciences Education* 14(4): 595-621.

- Mooradian T, Renzl B and Matzler K (2006) Who trusts? personality, trust and knowledge sharing. *Management Learning* 37(4): 523-540.
- Nonaka I (1991) The knowledge-creating company, *Harvard Business Review* 85(7/8): 162-171.
- Orlikowski WJ (2002) Knowing in practice: Enacting a collective capability in distributed organising, *Organisation Science* 13(3): 249-273.
- Raelin J (1997) A model of work-based learning, *Organisation Science* 8(6): 563-578.
- Rock I (1957) The role of repetition in associative learning, *The American Journal of Psychology* 70(2): 186-193.
- Schon D (1983) *The reflective practitioner: How professionals think in action*, Basic Books, New York.
- Szulanski G (1996) Exploring internal stickiness: Impediments to the transfer of best practice within the firm, *Strategic Management Journal* 17(1): 27-43.
- Van den Hooff B and de Ridder AJ (2004) Knowledge sharing in context: The influence of organisational commitment, communication climate and CMC use on knowledge sharing, *Journal of Knowledge Management* 8(6): 117-130.
- Van den Hooff B and Huysman M (2009) Managing knowledge sharing: Emergent and engineering approaches, *Information and Management* 46(1): 1-8.

Figure 1 – Conceptual Framework of Practical Knowledge Sharing Process

Source: Based on Argyris and Shon (1974)

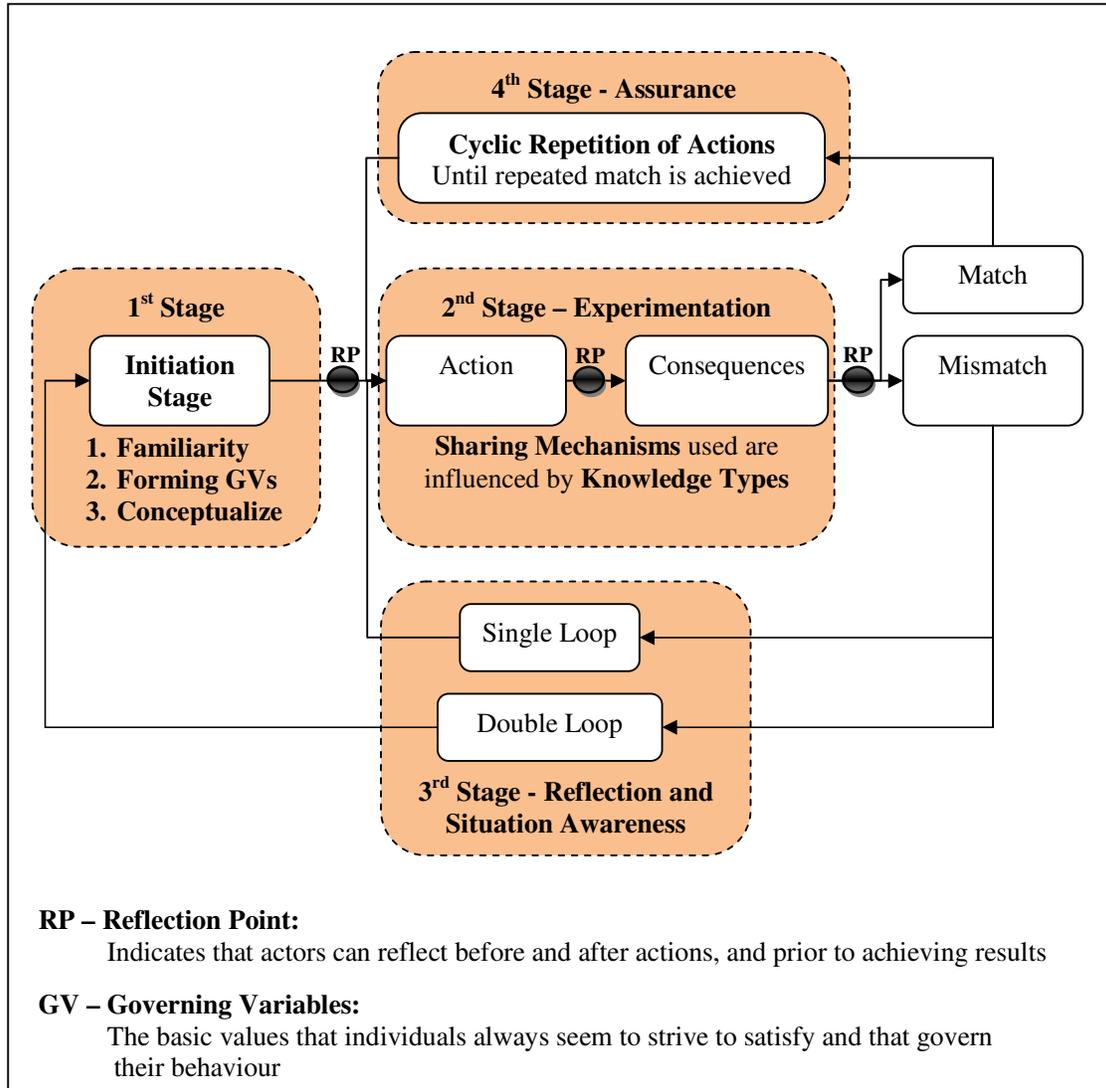


Table 1 – Summary of strengths and weaknesses of the relevant reviewed models of practical knowledge sharing

Author	Focus on	How Knowledge is Learned	Strengths (S) and Weaknesses (W)
Argyris and Schon (1974)	Individual Level (between espoused and in use theory) The model indicates that the learning does not occur until a match or mismatch is resulted and single or double loops learning actions is taken	Learning occurs through the process of actions taken to achieve expected outcomes between the espoused and in use theory. <input type="checkbox"/> Single Loop <input type="checkbox"/> Double Loop	S - Represents an overall view of the process and identifies when learning occurs W – Feedback is not only performed at the end of the result but could occur after conceptualisation, and action. The model also assumes that learning occurs when a match is achieved while repeated matches are a sign of learning
Kolb (1984)	Individual / Organisational Level Based on cognitive learning	Learning starts with: <input type="checkbox"/> Experience as the focal point of learning followed by <input type="checkbox"/> Reflective Observation <input type="checkbox"/> Abstract Conceptualisation <input type="checkbox"/> Active Experimentation	S - Experience is considered the focal point of learning, assisted by the ability of the individual to actively observe and reflect W – Overlooks the social aspects that impact the individual learning process.
Realin (1997)	Individual Level	<input type="checkbox"/> Conceptualisation <input type="checkbox"/> Experimentation <input type="checkbox"/> Reflection <input type="checkbox"/> Experience	S - Acknowledges the importance of ongoing experimentation and conceptualisation phases that form experience and learning W – Does not detail the influence of knowledge dimension on the knowledge learning process and treats knowledge sharing as a black box represented by the continuous interaction of conceptualisation, experimentation and reflection
Jarvinen and Poikela (2001)	Individual / Group / Organisational Level	Learning at the individual level through the cyclic interaction among the following processes <input type="checkbox"/> Concrete Experience <input type="checkbox"/> Reflective Observation <input type="checkbox"/> Abstract Conceptualisation <input type="checkbox"/> Active Experience	S - Represents the double loop of learning through a cyclic interaction between phases of learning W – Does not show how knowledge sharing occurs nor show the role of the knowledge types in the sharing process

Table 1 – Summary of strengths and weaknesses of the relevant reviewed models of practical knowledge sharing

Author	Focus on	How Knowledge is Learned	Strengths (S) and Weaknesses (W)
Orlikowski (2002)	Individual Level	Learning occurs through a combination of the following processes: <ul style="list-style-type: none"> □ Sharing identity □ Interacting face-to-face □ Aligning efforts □ Learning by doing □ Supporting participation 	<p>S - Process model focuses on the importance of sharing the identity with individuals to enhance learning</p> <p>W – Does not consider in-depth representation of how learning actually occurs. The model is perceived as if the process when implemented will assure learning, leaving the question about how learning occurs unanswered.</p> <p>Does not include the importance of reflection as a crucial part of learning</p>
Carlile and Reberich (2003)	<p>Individual /Group and Organisational Level (Treated as the same)</p> <p>Based on the concept of organisational learning, product development and innovation</p>	<p>Through a cyclic three stage process :</p> <p>1st – Storage: Every knowledge transfer attempt starts with previous knowledge that is stored in a certain context (documents, skills, process, etc)</p> <p>2nd – Retrieval: As not all knowledge can be allocated in one stored location the need to retrieve that knowledge from different media is required.</p> <p>3rd – Transformation: This occurs within and across specialisation, through building a common language of representation knowledge across boundaries and across individuals, groups or organisations.</p>	<p>S - This model has tried to unpack the knowledge sharing process and its understanding (three stage cyclic model)</p> <p>W – Needs further development as it does not state the influence of knowledge types and dimensions on the sharing process and how it occurs within the organisation. The model uses the storage and transformation stage to refer to the complex interaction required to share knowledge, but with minimal details.</p>
Gherardi (2006)	<p>Individual Level</p> <p>Is a cyclic multi-level process</p>	<p>Individuals have to interact within multi-levels to become practitioners</p> <ul style="list-style-type: none"> □ Know the context of the community of practice □ With practitioners in the community of practice □ Among practitioners in different communities of practice □ Organisational level 	<p>S –Focuses on communities of practice to become a practitioner, and views learning as mutli-level cyclic process</p> <p>W – All learning is situated in practice hence all learning has to occur within communities of practice for an individual to become a practitioner and overlooks the influence of knowledge dimensions and types over the learning process</p>