Learning in the Knowledge World

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INTRODUCTION

Learning and knowledge go hand in hand. It took several hundred years for the most advanced nations of the world to move from agricultural to industrial to information-driven economies that continue to challenge organizations to improve performance. During the past decade the new field of knowledge management (KM) has generated excitement and achieved increased visibility for its potential to leverage the newly recognized asset we call knowledge and, by doing so, bootstrap organizational effectiveness. During this same decade, the notion emerged that organizations can learn and from that learning create competencies that lead to competitive advantage and agility. KM and learning form a powerful force for improving organizational performance and accelerating the career growth of individuals who work primarily with knowledge, knowledge workers.

Learning, both organizational and individual, has seen a resurgence in popularity, driven by the accelerating pace of market changes, the Internet, the opportunities offered by virtual learning, and books such as *The Fifth Discipline: The Art and Practice of the Learning Organization* (Senge, 1990). The knowledge worker is now recognized as a major part of the workforce; that is, those workers that use their experience, education, and mental capacity to deal with the problems and opportunities arising from complexity, uncertainty, and rapid change (Drucker, 1989). Understanding complexity demands knowledge. Making decisions under conditions of uncertainty requires a KM approach to ensure organizational agility and knowledge sharing. Rapid change places high priority on learning and flexibility. Many companies living on the forefront of the emerging landscape are recognizing the importance of the relationship between Knowledge Workers, KM, and Learning. Each of these factors is interdependent with the other, and they are all consistent and synergistic with each other. In a culture that needs workforce competency and empowerment, the growth of KM provides a foundation to leverage and accelerate the improvement of both learning and knowledge worker performance.

Learning, individual and organizational, serves to keep knowledge workers and their organization up to date with changes in the external environment while creating energy, enthusiasm, flexibility, and collaboration among knowledge workers. It is with the knowledge worker that both innovation and action occur. Working in a knowledge-centric and learning culture, knowledge workers, individually and in groups, can create, leverage, and apply knowledge to meet changing needs. Knowledge management provides the emphasis, the enabling information technology, the processes, and the attention to help knowledge workers learn, collaborate, and implement the four major processes—creativity, problem solving, decision making, and taking action. Conversely, knowledge workers can support the objectives of KM and actively increase their own performance by sharing their knowledge and facilitating organizational learning.

These three aspects of the knowledge organization – KM, learning and the knowledge worker – both support and need the other two. This paper focuses on learning and the learning

processes that help knowledge workers keep up with the fast-changing world. As the environment becomes turbulent, nonlinear, and complex this relationship between knowledge workers and their organization takes on even more importance. Over the past decade, KM has grown up and is now a significant part of many knowledge organizations. The partnership of KM, learning, and the knowledge worker is coming into its own, as we will demonstrate in several examples.

Using these concepts to build a common framework for understanding, there are a number of ways that individuals can learn and some areas that are vital to the success of organizations at the forefront of this new world. In this paper we shall first set the groundwork by developing some baseline definitions. Second, we will explore the mutual interdependence between learning and the knowledge worker through a discussion of e-learning, action learning, and accelerated learning. Third, we will explore the relation between organizational learning and knowledge management in terms of organizational structure, strategy, technology, leadership and the environment. Fourth, we will explore areas of intersection: individual learning and KM, learning and communities of practice, learning and systems thinking, and learning and flow. Finally, we shall present a model that explores the learning continuum from an individual or organization highly interactive with its environment to an individual or organization whose thinking and actions have become static.

SETTING THE GROUNDWORK

To gain insight into learning and the knowledge worker, it is useful to start with a careful interpretation of knowledge. We are in close agreement with Sveiby when he takes knowledge to be the capacity to act. (Sveiby, 1997) Knowledge is tied to action because it is only through action that changes can occur and results be obtained. Tying knowledge to action recognizes the importance of tacit and implicit capabilities to take actions. For us, knowledge is best understood as the human capacity to take *effective* action, with the recognition that capacity includes both potential and actual ability. Many of the ideas normally considered to make up knowledge (data, information, facts, truths, concepts, theories, judgment, intuition, insight, experience, predictability, etc.) contribute to creating the understanding and ability needed to take effective action. This means that knowledge exists only in, and can be created by, the human mind. Since individuals, teams and organizations all may have the capacity to take effective action, they can all possess knowledge. Teams and organizations may have collective knowledge (both potential and actual) and therefore be capable of taking actions that an individual could not take.

Learning is considered to be the creation and acquisition of potential and actual knowledge. Thus, learning and knowledge are closely related but not identical. Learning is a process that creates new meaning from experience and new capabilities for action. Knowledge may be a process (taking action) or an asset (capacity) residing in the minds of knowledge workers. Often, we do not know what we know until we say or do something. Knowledge, like memory and riding a bicycle, is often created and brought forth from the unconscious mind when we need it.

The term *organizational learning* may refer to individual learning within the organization, the entire organization learning as a collective body, or anywhere in between these extremes. However, most organizational learning refers to either group learning or the entire organization learning. Of course, individual learning, or learning in small or large groups or as an entire organization may be needed for the firm to possess the requisite knowledge to take effective action. From a knowledge management perspective, all levels of learning are important and all must be nurtured to become a natural part of the culture. To date, firms implementing KM have put their emphasis has been put on locating, creating and sharing individual knowledge. For this reason, we consider organizational learning to refer to the capacity of the organization to acquire the knowledge necessary to survive and compete in its environment. However, there is an important distinction between individual learning and group/organizational level learning. Individual learning is a cognitive or behavioral activity between an individual and their environment, whereas in groups or organizations, learning is a collective process dependent upon relationships and interactions among individuals such that learning occurs primarily through the interaction of the participants and creates an understanding that is larger than any single individual process.

While individual learning is achieved by study, observation, cognition, experience, practice and developing effective mental models in the mind, organizational learning, being as much a social as a cognitive activity, occurs when groups learn to interact, share their knowledge and act collectively in a manner that maximizes their combined capacity and ability to understand and take effective action.

Organizational learning requires a sharing of language, meaning, objectives and standards that may be significantly different from individual learning. When the organization learns, it generates a social synergy that creates a global knowledge, adding value to the firm's knowledge workers and to its overall performance. When such a capability becomes embedded within the organization's culture, the organization may have what is called a core competency. These are usually unique to each organization and can rarely be replicated by other firms. The knowledge behind a core competency is built up over time through experiences and successes. It rests as much in the relationships and spirit among the knowledge workers as in the sum of each worker's knowledge.

Since individuals create organizations, it is they who establish the standards, processes, and relationships that enable group and organizational learning. But organizational learning is more than the sum of the parts of individual learning. For example, when individuals leave, effective KM will enable the organization to retain its corporate knowledge, that is, the knowledge that comes from the experience, cooperation and collaboration of its employees.

Some of the specific ways that organizations learn include: Single-Loop, Double-Loop, Deutero, and strategic learning. Single-loop learning (SLL) occurs when mistakes are detected and corrected, and then organizations carry on with their present policies, strategies and goals. Double-loop learning (DLL) occurs when, in addition to detection and correction of errors, the organization is involved in the questioning and modification of existing underlying assumptions, beliefs, norms, procedures, policies, and objectives. DLL involves changing the organization's knowledge base or organization-specific competencies or routines. (Argyris and Schon, 1978)

Deutero-learning (DL) occurs when organizations learn how to carry out single-loop and double-loop learning. DLL and DL are concerned with the why and how to change the organization, while SLL is concerned with accepting change without questioning underlying assumptions and core beliefs. SLL may prevent DLL from occurring. In order to encourage the deeper learning, organizations must move away from mechanistic structures and adopt flexible and organic structures. This requires a new philosophy of management, which encourages openness, self-reflection, and the acceptance of error and uncertainty. Adopting a bottoms-up or participatory approach can encourage DLL. There's often a difference between what people say (espoused theory) and what they practice (theory in use). (Argyris and Schon, 1978)

Strategic learning is defined as "the process by which an organization makes sense of its environment in ways that broaden the range of objectives it can pursue or the range of resources and actions available to it for processing their objectives." (Mason, 1993)

Knowledge management is a systematic approach to getting an organization to make the best possible use of knowledge in implementing its mission, broadly viewed as either sustainable competitive advantage or long-term high performance. The goal is for an organization to become aware of its knowledge, individually and collectively, and to shape itself so that it makes the most effective and efficient use of the knowledge it has or can obtain. By management we do not mean control in the sense of strong authority and direction. This style of management fails with knowledge because no one can control another person's mind--where the knowledge is. Instead, managers must first set examples through leadership, management and personal behavior. Then they must strive to create and nurture a culture and an infrastructure that stimulates workers to create, use and share their knowledge and that also supports their freedom to act effectively over a broad range of situations. When an organization lives in a turbulent, unpredictable, and challenging world, it must be a learning organization, capable of handling change, uncertainty and complexity. That is, the culture and infrastructure must be such that individuals and groups of individuals can and will continuously question and if needed, change their beliefs in order to create and apply new knowledge to achieve desired goals and objectives.

A *knowledge-centric organization* is one in which knowledge is recognized as a key success factor and is systematically managed through KM best practices. When maximum synergy exists between individuals in the workforce and KM, the organization amplifies its resource effectiveness, thereby providing sustainable competitive advantage and performance excellence. For this to occur, the organization must be able to sustain a dynamic balance wherein the individual and the KM system continuously adapt to each other through cultural expectations, flexibility, and empathy. By *culture*, it is meant the set of beliefs of employees about how the work should be done and what behavior is expected. There are things that the worker can learn, know, and do that will significantly impact organizational learning and performance. At the same time, there are many things the organization can do to support and help their knowledge workers perform more effectively. Both parties benefit from continuous collaboration and support.

KNOWLEDGE WORKERS

Knowledge workers do not always work in organizations that recognize the value of knowledge and have processes and technology that support and leverage the creation and application of it. Often, organizations need to be reminded aware that their performance is determined by the day-to-day actions of all employees. If a clear line of sight from these actions to the mission and purpose of the firm can be made visible, the value and contribution of knowledge workers can be understood. This line of sight is best seen as the interplay between KM, learning, and knowledge workers. Knowledge workers take action because someone (perhaps themselves) makes a decision to do so. That decision, in turn, is the result of some existing situation that needs to be changed. For nontrivial situations, problem solving can become challenging and generate alternative options often as the result of creative thinking and innovative ways of viewing a situation. Knowledge management provides the environment, learning keeps the knowledge up to date, and the knowledge worker both creates and acts on that knowledge.

There are four major processes used in knowledge organizations: creating ideas, solving problems, making decisions, and taking effective actions. Each of these processes can be implemented by an individual knowledge worker or by a team of workers. Each process presents an opportunity for knowledge workers to learn and increase both their knowledge and experience. Teams are particularly effective as learning experiences because many ideas and viewpoints are shared, and dialogue and discussion can help clarify questions and misunderstandings that participants may have, often leading to "a-ha experiences." To get the maximum learning from team meetings, the knowledge worker can take a number of actions. These actions include: keeping an open mind, not taking sides quickly, and always remembering that knowledge is never absolute. The efficacy of knowledge depends on its situational context and the future flow of events. The former is never completely known and the latter is often contingent upon many unpredictable interactions.

The knowledge worker who actively listens and reflects on multiple views will not only achieve understanding and insights that leverage and modulate his/her own knowledge but also develop an objective, systems-oriented perspective that significantly contributes to problem solving and cognitive growth. If the team is interdisciplinary, the awareness and appreciation of other modes of thinking and fields of learning will significantly enhance the knowledge worker's ability to integrate information and balance priorities, thereby preventing the hardening of sides and viewpoints during team discussions. The ability to remain objective and still be part of a discussion is a mark of leadership that helps both the knowledge worker and the organization.

Teams have proven their ability to improve decision-making and enhance learning. (Katzenbach and Smith, 1993). Knowledge workers can improve their learning during team problem solving and decision-making by withholding their own beliefs and opinions until late in the dialogue process. A position stated quickly becomes a position defended. When this occurs, the conversation moves from open inquiry to a debate or face-saving challenge. Much learning is lost when debate replaces inquiry. Although debates can certainly be learning experiences, much more learning can occur during deeper levels of thought, such as assumptions, context, patterns, relationships, and expectations of the future rather than the higher levels of beliefs, events, and

opinions. Beliefs, events, and opinions are surface phenomena that usually represent information, not knowledge. Keeping group discussions at deeper levels requires an open and supportive organizational culture (KM) and continuous team-member attention to learning (Bennet, 1997).

Physical environment, culture, and interpersonal relationships must be taken into account for a team to achieve learning and high performance. The use of groupware, such as whiteboards and computer systems that allow input from every team member and real-time integration and display of ideas, can be very helpful. The physical layout of working spaces also influences the way knowledge workers think and feel during meetings. Good facilitation is essential for productive and open communication among diverse knowledge workers. Individual empowerment of team members gives them confidence and strength of resources. Many of the KM objectives, such as knowledge sharing, knowledge repositories, knowledge systems, storytelling, knowledge flow channels, and communities of practice provide strong support for team performance and individual learning.

Classical research in adult learning has two primary foundations: Malcolm Knowles (1998) research in adult learning and David Kolb's (1984) research in experiential learning. Knowles identifies the conditions in which adults learn best and the human characteristics that drive those conditions. For example, adults are usually driven by real-world problems and learn best from solving problems that are directly related to their current work. They are self-directed and each individual, usually without conscious awareness, has developed a comfortable way of learning that is unique and maximizes his/her ability to take in information and create understanding. Although there are many individual learning "styles," a given worker will usually have one particular style that is most effective and most personally satisfying. A knowledge worker who takes time to "learn how to learn" will be able to learn via several styles. Since much learning takes place in situations that are not within the learner's control, being able to learn through images, lectures, reading, dialogue, debate, computers, and so forth will be very helpful over the long term.

Often team or group learning can be very effective if it is planned and run by an experienced leader or facilitator. Learning does not automatically occur among team members simply because they are talking to each other. Simulations can be very effective learning tools for individuals and for teams. Even though their initial development may be expensive, once developed, simulations are very economical for large numbers of learners. Systems Dynamic modeling is one example of coupling groups of managers and computer modeling to clarify issues and help knowledge workers make sense of their organization's behavior and take any necessary corrective actions. (Vennix, 1996)

Another challenge for the learning knowledge worker is the increasing number of situations in which learning can take place. As the Internet grows, there will be more learning through browsers, chat rooms, and communities of practice. Normal classroom education will still count, as will conferences, retreats, and other off-site experiences. An often neglected, yet most important source of learning, is the casual conversation that occurs around the coffee pot. An informal question-and-answer exchange concerning issues at work between two colleagues of differing experiences can lead to significant growth in the knowledge of both workers. Organizations that are aware of these gains make special efforts to design their facilities and the

knowledge workers' spaces so that they may take advantage of these natural cross-fertilizing opportunities. They often provide the information technology that supports learning and knowledge sharing. (Coleman, 1997). While no one can "order" a knowledge worker to learn or share knowledge, the smart organizations nurture and create environments within which learning and sharing occur naturally. We will now look at several of the main trends and methods of learning, particularly those appropriate for the knowledge worker.

e-LEARNING

According to Rosenberg, e-learning refers to the use of Internet technologies to provide many types of solutions to enhance knowledge and performance (Rosenberg, 2001). Note that this definition focuses on the Internet but allows a wide variety of possibilities for learning, creating, and changing knowledge. The advantages of e-learning include reduced cost and time of both instructors and students. Once an e-learning course has been developed, it can be given to a large number of people with minimum expenses. The material can be updated at one time and all students can quickly be notified. Changes and new ideas can be easily inserted into the material. Discussion groups operating in conjunction with e-learning courses allow students and instructors to dialogue and expand upon the material as needed. The main thing missing is the interpersonal interactions that allow in-depth exchange of ideas and insights through real-time conversations with facial and other nonverbal communications. While e-learning may not work for learning deep knowledge about complex subjects, it is well structured for many knowledge worker needs.

A good example of e-learning comes from the Department of the Navy. Early in their implementation of KM, the Department of the Navy realized it could not become a knowledge-centric organization without being a learning organization. They also realized that when they coupled the fast pace of change with a geographically dispersed, rotating workforce, e-learning had to become a necessary part of their strategy. The Deputy Chief of Naval Operations established a high-level taskforce to provide the tools and opportunities that would enable people to learn, grow, and develop into successful leaders who could make a difference in the Navy. In a hierarchal, military structure, direction from senior leadership is the impetus for success. This enterprise-wide effort led to a partnership between the education and information technology leaders to develop a virtual toolkit to operationalize e-learning. The toolkit provides resources and connections that form the network of education and learning in the department. In the spring of 2002, the Department of the Navy was named a "Most Admired Knowledge Enterprise," the only public-sector organization to receive this honor. Alongside such organizations as Microsoft and IBM, the Navy was specifically noted for its emphasis on organizational learning.

ACTION LEARNING

Another form of learning, known as action learning, uses a team or group to solve real, practical problems while deliberately emphasizing learning as they do. The action-learning group takes a systems approach to solutions since their actions are designed to affect all parts of the organization necessary to ensure long-term problem resolution. Thus, action learning enhances individual and group learning, facilitates organizational change, and solves real-world problems.

Action learning is a special form of team learning, problem solving, and implementation. The group has a facilitator, and learns through questioning and reflecting clarified via group dialogue. True to the concept of knowledge, an action-learning group is committed to taking action but only after considerable time is spent in understanding the problem, the situation, and the ramifications of potential actions. In effect, an action-learning group becomes a knowledge creating (learning) team. This process not only improves decision making, it also achieves buy-in by team participants and creates a learning environment within which team individuals and their organization can learn and share their own knowledge. This learning occurs when the group is open to new ideas, questions past and current assumptions, and works collaboratively toward a common interpretation of the problem based on their collective understanding and experience. The organization's role, through KM, is to provide: work spaces that are conducive to open conversation and honest inquiry, effective information technology support and information repositories, and a culture that rewards knowledge sharing

Although the concept originated many years ago, action learning has now come to the forefront as an effective way to meet the demands of the new world (Marquardt, 1999). There are recognized successes throughout the current literature. Several years ago, a large government program in the Defense Department requested one of the authors to lead a team to identify and evaluate the management risks that could impact program success. The program included seven organizations that had to work together; a complex parts supply chain; two refurbishment and rebuild depots; several ordering and stocking facilities; and private industry participation. Although each organization was competent and dedicated, there was inadequate coordination among the organizations and the knowledge workers had little time for learning. Also, the "not invented here" syndrome made communication difficult.

An action-learning approach was taken and nine carefully selected, highly competent team-members were chosen. The members represented all of the organizations as well as the professional experience needed to assess the problem and identify solutions. During start up, it became clear that, although the team was working well together, they were not aware of what each other's organizational problems, constraints and true objectives were. Most important, knowledge workers in all of the organizations were not aware of the impact of their own decisions on the other organizations as the consequences of their work flowed through the enterprise. Everyone was too busy to be concerned with each other's work, resulting in each organization doing high-quality work that often created problems for the rest of the enterprise. It was a classic situation of the need to understand risk and become aware of the impact of every part of the complex flow of work on the other parts of the system—a good opportunity for an action-learning group. After reviewing and refining the team's mission, a charter was prepared, submitted to a higher authority, and quickly approved. A series of briefings allowed team members to understand the full scope of the program and the nature of the participating organizations. During this time, the members got to know each other, created their own common language, and addressed a number of basic values.

Many learning sessions on organizational structure were conducted on subjects such as: the nature of enterprises, systems theory, risk management and communication. All were closely related to the problems at hand. This enabled team members to broaden their understanding of all organizations within the enterprise and to appreciate their own organization's role. As the

various processes and procedures were evaluated, many suggestions and ideas were offered by members who were not participants in these processes but saw them from a new and often insightful perspective. Real learning, that is being surprised and experiencing a leap of understanding, began after the third day. Formality drifted away and real questioning, response, and counter questioning began when the team developed their own meaning of risk and how it should be defined for their task. There were many discussions on what approach should be used to identify and map out the various risks throughout the enterprise and how to gather the desired information. These interactions were more a learning process than result producing. No one was pressured into accepting someone else's conclusions. Instead, there were many deep dives into what assumptions were behind those beliefs and conclusions. Although heated debates and strong feelings emerged, the team was able to do their own double-loop learning, without being force-fed or lectured.

The outcome of the 35 days that the team spent together was a detailed identification of the specific risk areas and the expected levels of risk, along with ideas on how these risks could be reduced and maintained in the future. A risk-interaction matrix was developed to indicate the likely impact of a negative event in one part of the enterprise on all other dependent work efforts. Such a matrix demonstrated to everyone how important it was to communicate and collaborate with other individuals and organizations that were part of the enterprise. One surprising result was the possibility of turning risk-management practices into opportunity-management practices, with the only difference being that a risk results from a potentially negative event and an opportunity results from a potentially positive event. Another benefit from the action-learning effort was the personal and professional growth that occurred within the team members. The ability to be more receptive to other viewpoints, and to discern differences and discriminate their value was a measure of personal growth. Also, the capability to reintegrate those differences, ideas, or interpretations into a cohesive, meaningful whole is a competency not often encountered.

Such personal development can occur when a team learns to work together, dissect, and understand major facets of the organization and then bring them back together into a complex system that produces a desired product**.** Put another way, their domain of action and sources of knowledge expanded as a result of solving a real world problem that was of high interest and importance to them. Not only had they made useful contacts and learned from them, they also saw the enterprise in a new light and understood their own problems within a broader context. While KM was largely unknown to the enterprise at that time, the attitudes of the senior executives and the organization's culture permitted, and even encouraged, such learning. Information technology was used to maintain a team Web site, an intranet was available throughout the enterprise, and a meeting space was found that offered the needed groupware support. However, in the end, it comes down to the human-to-human interactions and the trust and ability to listen and share understanding with each other that spurs learning and creates knowledge.

ACCELERATED LEARNING

Accelerated learning is a systematic process designed to take advantage of our brain's full capabilities through the use of findings in recent research in neuroscience. Recognizing that

our brains are highly complex—with five types of memory; right and left hemispheres that specialize in different capabilities; three major parts (a brainstem, limbic, and neocortex) each with different functions; and eight intelligences (language, logic, visual-spatial, musical, kinesthetic, social, interpersonal, and naturalistic) (Gardner, 1993)—accelerated learning is an approach designed to take advantage of the whole brain's capability to learn. Briefly, the process consists of six phases: motivation, getting information, finding meaning or sense making, committing to memory, practicing what you have learned, and reflecting on how you have learned. The techniques used in each of these phases could best be considered as meta-learning since their purpose is to help one learn how to learn. Each of Gardner's eight intelligences is inherent in everyone to varying degrees, and they all can be improved through learning and practice.

While individuals can personally make good use of the ideas and practices of accelerated learning, the best learning often occurs in a low-stress, small-group environment that is positively reinforcing, with some enthusiasm and humor (Rose and Nicholl, 1997) In addition, the knowledge worker must want to learn, that is, the material must be relevant, needed, and applicable. It helps to deliberately involve as many senses as possible. Studying and exploring a problem from each of the eight intelligence areas provides viewpoints, insights, and solutions that may not otherwise surface. Another useful technique is to search for good metaphors and analogies that provide windows to better understand the problem.

The following is an example of how a small professional services firm changed itself through collaborative learning. The company, Dynamic Systems, was in the highly competitive engineering and professional services field, predominately working for the U.S. government. Dynamic Systems grew to about 120 professionals over its ten-year history but was lagging behind its competitors in the application of IT, in the ability to leverage knowledge within the company, and in applying that knowledge to provide fast, high-quality customer support. In other words, it was not all of the knowledge it had to create the desired competitive edge. There was also no clear direction for company growth. This was not unusual in this industry since growth was primarily achieved by winning competitive contracts from a wide range of clients.

The company's growth had slowed and senior management recognized that technology was significantly changing the competitive landscape. It also became apparent that there were a number of much larger companies in other industries that had been able to achieve what was popularly known as "world-class" status. It was concluded that the organization needed to change within the next few years or the company could easily fall far behind its best competitors. Being a professional services firm, it was recognized that about 90 percent of its value was in the minds and behavior of its employees. Increasing that value had to come from the knowledge workers themselves. Since the employees were motivated and competent professionals, the strategy selected was to make the workforce aware of these concerns and empower them to participate and find solutions. Whatever the solution looked like, it would require employees and senior managers to change their daily actions, in other words, to learn. The tenets of both action and accelerated learning were found to work nicely with the goals of the organization.

They began by analyzing the current and anticipated environment, and identifying those world-class organizations that were demonstrating successful practices in markets similar to

Dynamic Systems. Five teams were formed from volunteers throughout the company. The teams dealt with the vision, the use of technology, customer service, the bid-and-proposal process, and the employee management process. Employees from all levels of experience were encouraged to participate, as well as representatives from all departments. This ensured the diversity of thinking and encouraged cross-department communication and systems thinking. All teams were briefed and encouraged to ask questions and add ideas. Using only volunteers and keeping an open dialogue led to highly motivated teams. Charters gave the teams both freedom and empowerment. Funds were allocated and the teams were given six months to research their tasks, develop programs for achieving their objectives, brief senior management, and prepare and present a half-day learning session to every employee in the company. All team members participated in presenting the learning sessions.

As the vision team developed its ideas, they briefed the other teams in order to get feedback and receive direction in terms of the company's long-term objectives. This process provided a reference point for the other teams to ground of their research and focus their efforts. At the briefings and learning sessions, all team members participated in answering questions and generating ideas. During these discussions, care was taken to reflect on the work and its potential effect on both individual and organizational performance. This ensured understanding and buy-in for the implementation of the recommended actions. The results were later used to provide an up-to-date orientation for new employees.

Since about 35 percent of the employees had participated in the learning process, there was enough critical mass to bring the entire company into alignment. Several changes included increased training in technology, much greater use of teams and knowledge sharing, an improved process for customer support, and better customer feedback. A second round of teams were started after 18 months that included a strong effort in KM to formalize the company's internal ability to share knowledge and use technology in order to add value to customer products.

Within three years, the company growth rate went from 5 to 25 percent per year. There was a significant increase in profitability, a higher rate of employee satisfaction, and a significant increase of the company's market value. As in all organizations, there is never a single cause and effect between planned change and results. Many complex interdependencies are involved. However, by bringing the employees into the challenge and creating an environment in which they learned quickly and practiced what they had learned, the entire organization could work cohesively and move together. Although larger organizations would be more difficult to move, the principles of collaboration, participation, and learning are still fundamental and highly effective.

LEARNING BEYOND THE PROFESSIONAL AREA

As the world moves into the age of complexity and events become more difficult to predict, there are certain areas of knowledge that are becoming essential for career success and for maintaining organizational performance. Because technology and the pace of change will almost surely continue accelerating, successful knowledge workers must be able to learn rapidly, continuously, and flexibly to fulfill their work responsibilities and maintain employability, as well as employment. This means that they must learn how to learn in a variety of situations and

in many different ways. Rarely, if ever, do we reflect on how we learn and consciously try to expand the ways we learn. Living in the world of the future, where professionals often deal with five to ten subject areas in the course of an hour, requires the ability to communicate and share understanding with professionals from other disciplines, and make decisions and solve problems that entail multiple subjects.

Essential areas for most knowledge workers include: learning how to learn, having knowledge about knowledge, systems thinking, complexity thinking, risk management, networks, networking and relationship management, questioning, facilitation, flow, information literacy, judgment and intuition, knowing, sense making, and peripheral discipline awareness. This assumes that the knowledge worker knows his/her professional field and continuously learns to keep up with that field. Most of these areas are touched upon throughout this paper. While each area deserves extensive attention, we shall only provide several short definitions of new areas and further explicate "learning how to learn".

Complexity Thinking. While complexity theory has been studied in the sciences for several decades, it has recently expanded to apply what has been learned to current organizational and management issues. Both evolution and human history have repeatedly shown that systems that survive over time do so by becoming more and more complex. In simple terms, complexity describes a system or organization that has so many parts (people) and relationships that it is not possible to take into account all of the causal relations underlying its behavior. Just as Systems thinking has become a hallmark of many of today's successful professionals (Senge, 1990), being able to recognize, understand and deal with complexity is the challenge of the immediate future.

Relationship Network Management. The relationship network is a matrix of people that consists of the sum of a knowledge worker's relationships, those individuals with whom the knowledge worker interacts, or has interacted with in the past, and has a connection or significant association. Relationship Network Management occurs when we recognize the potential of these relationships and use them to share knowledge and learn, creating and sustaining a conscious give and take movement, or flow, across the network.

Information Literacy. Responding to the information and knowledge age, Information Literacy is a set of skills that enable individuals to recognize when information is and is not needed, and how to locate, evaluate, integrate, use and effectively communicate information. (Department of the Navy, 2000) These skills are critical in dealing with the daily barrage of information; and the broad array of tools to search, organize and analyze results, and communicate and integrate them for decision-making. In the U. S. Department of Labor's 1991 Commission on Achieving Necessary Skills, Information Literacy was called out as one of the five essential competencies necessary for solid job performance.

Knowing. Knowing is seeing beyond images, hearing beyond words and sensing beyond appearances. This is a blending of the cognitive capabilities of observing and perceiving a situation, the cognitive processing that must occur to understand the external world and make maximum use of our intuition and experiences, and the faculty for creating deep knowledge and acting on that knowledge. Knowing provides methodologies to increase individual sensory

capabilities and increase our capability to consciously integrate these sensory inputs with our tacit knowledge, that knowledge within us that is a product of all of our past learning and experiences but is difficult to put into words or transfer. In short, we don't know everything that we know. By exploring our sense of Knowing we expand our understanding of ourselves, improve our awareness of our external world, and increase our skills to affect internal and external change.

Learning How to Learn

From an external perspective, we believe others have learned when they demonstrate changes in behavior that produce effective results. In exploring learning how to learn, we will consider learning in the context of acquiring complex concepts and deep knowledge as distinct from simple data and information. Because of our individually unique genetics, development, experience and cognitive and emotional characteristics, there is not a single process that results in maximum learning. Some people learn best from reading, some from listening to lectures, some from teaching, some from dialogue, social conversation or listening to stories, some from visual displays, some from internal reflection, some from intense debate and some from rituals and repetition. Any one or combination of them may work best at any given time and situation. For the sake of this discussion, we take as an axiom that the responsibility for learning, and learning how to learn, falls on the individual professional, and that self-directed learning is usually the best. Any general theory of learning cannot take into account individual characteristics. Unfortunately, "It has been found enormously difficult to apply laboratory-derived principles of learning to the improvement of efficiency in tasks with clear and relatively simple objectives. We may infer that it will be even more difficult to apply laboratory-derived principles of learning to the improvement of efficient learning in tasks with more complex objectives." (Hilgard and Bower, 1966)

Another axiom offered is that proactive learning is better than reactive learning. Academic institutions, training programs and other adult educational programs that offer or facilitate learning are useful, but in general they produce students that are passive learners. As Knowles noted "For some time now I have been aware of the fact that the products of our educational system don't know how to learn--they only know how to be taught." (Knowles, 1972) Yet for most situations passive learning is inadequate, only the adult learner knows what knowledge is needed, when it is needed, how it will be used and possibly how best they can learn.

As we move through the phases of our professional life, our local environment within which we work and learn may change significantly. In school we probably learned from lectures and self-study, yet our learning dealt mostly with theory and tractable problems. In real life we have to learn to deal with ambiguity, no-win problems and messy situations. We also must learn to learn in a wide variety of local environments, some of which we find difficult or even offensive. In other words, to maintain learning over time and in a wide variety of situation we must *learn how to learn*, a subject that is rarely discussed in academia or in the corporate world.

Since each of us is unique, with our own history, motivations and cognitive skills and preferences, we take as a premise that our ability to learn will also be unique to each of us. It

then follows that learning how to learn will be a personal journey, undoubtedly with help from others, but the brunt of the work must be done by each of us. If we consider the need to learn deep knowledge as noted above, then the normal academic approach of lectures and self-study may well be inadequate. If "X" is some challenging, complex subject, we may learn about "X" but we must live with "X" to learn "X". That is to get the "feel of X", to be able to anticipate the consequences of our decisions and actions, and by doing so, achieve effective results. Only experience coupled with practice, thinking, questioning, challenging, guessing and trial and error creates the insights and a-ha experiences that lead to real understanding and comprehension.

A most important question is: How do we learn how to learn from all of these ways of gaining data, information and knowledge? Since each of us is unique the starting point is to know ourselves: our own strengths, weaknesses, feelings and likes and dislikes relative to the acquisition and assimilation of new information and knowledge. How we have learnt best in the past, what our preferences for receiving new information and, most important, can we learn how to learn from all of the various techniques and artifacts of learning situations. As professionals we will continue to be exposed to a wide variety of learning situations such as those mentioned above. If we dislike learning from lectures, we should make an effort to learn from lectures. Every process for learning can contribute to our stores of knowledge and to ignore some methods by "turning off" is to lose an opportunity. Each individual can look at a give situation and reflect on how to learn from that situation. Two perspectives are helpful. One is to look at the situation and ask what is in the situation that I can learn from. The second and more difficult is to ask yourself what do I need to do to get the maximum learning out of this system-composed of the situation, me, and the interaction between us. Answers to such questions will encourage each of us to learn how we learn in each situation. Lets take a couple of examples-storytelling and reading.

Storytelling and Reading. Most people are aware of the power of stories to communicate understanding, values and guidelines. They are easily remembered and recalled when needed and may even serve as internal mentors that offer guidance to the person when they find themselves in a situation related to the lessons of the story. Storytelling could perhaps be looked at as teaching. This may be true, albeit incomplete. The storyteller can learn from listening to the comments and observing the reactions of the audience. Any forthcoming dialogue will give the storyteller much greater insight into the different meanings and insights lying within a good story. However to learn from such an experience, the storyteller must consciously ask questions, listen carefully and be open to different interpretations of her story. Just as good teachers learn much from their students, every professional can learn from helping others learn.

Many people consider reading a book a passive activity. In doesn't have to be. Since we all learn from an interaction, a dialogue on a given subject, we can interact with a book by highlighting or underlining passages we believe are important to us. This simple process gives the unconscious mind more time to absorb the sentences and think about them. By prioritizing ideas and concepts using a four star system next to important areas we can easily return to the book and pick out areas that were most interesting and important, thereby reinforcing or reviewing our earlier thoughts-again reinforcing learning. Another technique is to challenge statements believed to be untrue, thereby creating action items for our own further research. Or

we add our own thoughts and questions in the margins where the author made statements that trigger our own knowledge.

In other words, we can become active participants with the book and use it as a vehicle for creating and pulling information and knowledge from our own experience or unconscious mind. There is an old saying that is very appropriate: "We don't know what we know until we say it, write it or think it." Thus if a book is read not just as a source of someone else' ideas, but as a tool to leverage our own experience, emotions, intuitions and creative powers, we can amplify our learning from every book we read. To do this takes patience, practice and time. It is an example of learning how to learn and each reader will have to develop his/her own techniques: Techniques that are comfortable and fit individual learning preferences.

The above examples are not meant to be definitive. They hope to suggest the sometime invisible situations that can be used by professionals who seriously want to maximize learning and are willing to put personal effort into answering the question: "How can I gain the maximum knowledge from this specific situation?"

Concluding Thoughts on Knowledge Workers

The best knowledge workers will be able to learn and apply their knowledge in collaboration with others, while simultaneously recognizing the breadth of information and knowledge needed to comprehend and resolve complex problems and situations. To be successful, they must also be able to manage knowledge in the sense of recognizing, creating, finding, and moving knowledge that is valid, useful, and applicable to the issue at hand. Beyond this, knowledge workers must have the foresight to sense their future knowledge needs and acquire that knowledge to handle challenging problems well before the problems arise. Even though they may not know the specific problems that will be faced, they should be aware of the *types* of issues and challenges that may occur. In the best case, knowledge workers should direct their learning and manage their knowledge so they are well prepared for both present and future challenges. This will be the payoff from learning how and when to learn and from treating their knowledge as a manageable asset that greatly influences career success. Since their competency is the source of the organization's performance, KM and learning become everyone's responsibility and everyone's gain. The trio is thus intertwined, and loss of any one will significantly impact the others.

THE COMMON GROUND: ORGANIZATIONAL LEARNING AND KM

In an organization where understanding and the ability to take effective actions are major challenges because of the organization's environment or the nature of its work, both knowledge management and organizational learning become critical factors in its long-term survival. In fact, these two fields are so important that they must become embedded within the organizational philosophy and culture such that they are continuous, widespread and mostly invisible. That is, such that they are found in the habits, norms and expectations of the workforce, managers and leaders of the organization. To the extent that such an ideal can be achieved, knowledge management and organizational learning will be interdependent and inseparable, but not identical. To understand this relationship we explore a number of characteristics of organizational learning and knowledge management and see how they naturally complement and reinforce each other.

In the current and future environment of business, the major challenge relates to finding, creating or developing *understanding and meaning* of the complex events, situations and patterns arising from an uncertain, complicated and rapidly changing world. Cross and Israelit observe "many organizations have recently turned to knowledge management in an effort to improve business performance." (Cross and Israelit, 2000)

When major paradigm shifts occur in an organization's environment, or within its own strategy or vision, the organization may face its ultimate challenge: Finding a new self-image, giving up current doctrine and replacing strongly held beliefs with ones that more accurately represent the new reality. Thomas Kuhn, Chris Argyris and others have noted the great difficulty organizations have when confronted with the need to rethink their basic assumptions and beliefs because of rapid shifts in their landscape. This is precisely where organizational learning is put to its greatest test and where knowledge management finds its reason for being.

Addressing the issue of how organizations can enable complex knowledge-intensive processes to adapt to changes in their environment, Ruggles and Little believe that, by definition, these processes tend to have a very short half-life. "What needs to be known for effective process execution is constantly changing. Active knowledge management can support these processes in such environments by giving the process executors ongoing access to the knowledge that keeps these processes effective, as well as enabling them to feed back what they have learned as they

go." (Ruggles and Little, 2000) It is not easy to share knowledge; but it is even harder to give up old practices and beliefs that have worked well in the past. As noted above, this requires double-loop learning. KM, focusing on organizational mission, strategy and vision, should be able to detect changes in the outside world. Organizational learning, then, has the challenge of identifying the new learning that will succeed and of replacing the old knowledge with the new.

Cross and Israelit clearly link knowledge management, organizational learning and the human resources of the organization. They state that today's knowledge worker—the organization's human resource—is "valued precisely for his or her ability to contribute unique knowledge, skills and technologies forming the heart of what most organizations are calling knowledge management." They continue, saying that to truly leverage knowledge, "we must work with the subjective nature of learning and the idiosyncrasies of all those people we find in organizations—a task requiring greater attention to individual and social processes of learning in organizational settings." (Cross and Israelit, 2000)

Based on his work with Clarica Life Insurance Company, Hubert Saint-Onge discovered that: "If human resource professionals want to play a key role in leveraging their organizations' knowledge, they must first redefine their traditional functions and roles for the new knowledge era. Knowledge is an increasingly critical commodity, and a knowledge strategy must be at the heart of the new mandate for human resources." (Saint-Onge, 2000)

Ideally, one would like to embed organizational learning within a knowledge management program in support of KM processes. To achieve this there would need to be a knowledge network of workers, managers and leaders supported by an infrastructure of technology and processes, with an organizational structure of collaborating teams and a culture of learning and sharing. This combination would significantly improve the organization's ability to change its learning (and unlearning) rate. The result being the organization's ability to provide rapid internal adjustments that allow it to quickly change in response to external demands. Such an organizational agility is the result of close collaboration between Knowledge Management and Organizational Learning efforts.

Organizational memory can be made of both hard data (such as numbers, facts, figures, reports and other documents and rules) and soft information and knowledge (such as expertise, experiences, anecdotes, critical incidents, stories, artifacts, context information, details about strategic decisions, and tacit knowledge). Most firms have information systems such as inventory control, budgetary, and administrative systems that store and retrieve hard data or facts, but many do not capture the softer information. Ideas generated by employees in the course of their work are often quickly forgotten, yet they can be captured through explicit narratives stored electronically for future reference.

Firms are increasingly focusing on the concept of organizational learning to increase their competitive advantage, innovation, and effectiveness. Organizational learning is accelerated when a firm, through knowledge management, creates a common knowledge repository, identifies and codifies competencies and routines, including acquiring, storing, interpreting, and manipulating information from within and external to the organization. Knowledge management, through knowledge sharing processes, leverages both individual and organizational learning. By improving the quality and speed of communication and the understanding of problems and changes surrounding the organization, organizational learning and knowledge management jointly increase the quality of decisions of the organization and the effectiveness of their implementation.

Organizations learn to increase their adaptability and efficiency during times of change. Learning is a dynamic process that manifests itself in the continually changing nature of organizations, as exemplified by innovation, collaboration, culture shifts and high morale, especially during times of uncertainty and external challenge. Both knowledge management and organizational learning use knowledge generation and knowledge sharing as foundation elements. To be successful, these capabilities require a high level of attention to human factors: roles and responsibilities, experience, motivation, self-image, respect and trust, honesty and integrity and the quality of interpersonal relationships throughout the firm. Since much of our knowledge is tacit, existing within our memories and unconscious mind and not easily articulated, its development and sharing is very much a social process. (Nonaka and Takeuchi, 1995)

In today's rapidly changing, erratic and increasingly complex environment, knowledge creation, acquisition and application through continuous learning are likely to be the only solution to survival and excellence. Organizational learning is contingent upon a number of factors such as leadership, structure, strategy, environment, technology, and culture. Knowledge management hopes to create and nurture these same factors to make optimum use of the organization's knowledge. Looking at several of these factors will allow us to see the close relationship between knowledge management and organizational learning.

Structure

Structure represents the set of arrangements among the resources of the organization. The resources may be people, facilities, technological, financial or conceptual. How these resources are related to each other, and especially their influence on human culture and human relationships, influences a firm's self-image, its beliefs about the external world and its ability to learn and change. Whether a firm lives in denial of external change or embraces that change and, through learning, strives to adapt or influence those changes is heavily influenced by both structure and culture. The increasing emphasis of many firms on information management rather that classical capital management can be seen from Strassman's estimate that "corporations throughout the developed world are devoting between four and ten times the resources to information management than are deployed for industrial-age capital management."

Hierarchical, controlling structures by their very nature tend to prefer stability and minimize the learning and close collaboration needed to meet significant change or paradigm shifts. Loose structures (even hierarchical) that have a culture of sharing and collaboration can often facilitate learning and allow the freedom to change. However, they must also have clear direction and coordination, otherwise the resulting actions will be diverse and the lack of focus may make them unable to support major organizational objectives. Organizational learning can occur for all the wrong reasons. When this occurs, often learning is incapable of providing value to the firm. Here is where a knowledge management effort that creates and manages a structure to correlate the learning and concomitantly focus the application of that learning can pay big dividends. KM can do this by integrating corporate strategy, vision and structure, using knowledge as the common denominator and corporate vision as the guidepost. However, too much limitation on knowledge focus can create an inability to respond to surprises and major environmental paradigm shifts.

Unless deliberately provoked, most organizational structures tend to become rigid over time. To prevent such rigor mortis, and to keep the workforce flexible and open to personal and professional change, organizational learning and knowledge management need to encourage and make use of flexible and changing structures, at the same time retaining the capacity to focus and

correlate local knowledge and activities as needed. Policies such as moving people around to broaden their experience and revitalize their challenges, continuously bringing new people into the organization at all levels and deliberately changing organizational relationships will catalyze and perpetuate both individual and organizational learning. Encouraging open communications, getting both managers and workers to constantly challenge their own basic assumptions and support prudent risk taking and team collaboration will encourage a culture that nourishes and updates the organization's knowledge, ergo its effectiveness. From a measurement view, the only true measure of effectiveness of organizational learning and knowledge management is how well the organization meets its current and strategic objectives—the true bottom line of the firm. This will require a line of sight from the organization's policies, decisions and actions to its organizational learning and knowledge management efforts to its overall performance.

Strategy

Strategic applications of information systems for knowledge acquisition can take two forms: Capabilities for assimilating knowledge from the outside (such as competitive intelligence systems acquiring information about other companies in the same industry) and capabilities for creating new knowledge from the reinterpretation and reformulation of existing and newly acquired information (such as executive information systems or decision-support systems). They can also be environmental scanning and notification systems and intelligent and adaptive filters.

Learning is stimulated both by environmental changes and internal factors in a complex and iterative manner. An organization's strategy influences learning by providing a limit, or focus to decision-making and a framework for perceiving and interpreting the environment. In turn, the strategic options chosen will depend on the unique history, culture, and learning capacity of the organization. Such causal feedback loops are widespread within organizations, demonstrating why it is so difficult to change organizational behavior and mindset. Knowledge management, by providing a systems-wide perspective that can affect all parts of the firm, may initiate change in the perception of knowledge and learning and in their role in improving organizational performance. By making multiple changes throughout a firm, it is possible, but never certain, that the above-mentioned closed causal loops can be modified in such a way that employee behavior becomes redirected toward learning and knowledge application. For example, a knowledge management effort might change the technology, the communication networks, the physical spaces, the questions asked by policy makers and the expectations of employees—all changed in a way that would encourage and facilitate learning, collaboration and the awareness and respect for knowledge and its role in the organization.

Technology

The influence of information systems, in particular, can be considered two-fold: Direct influence and indirect influence. Information systems can indirectly influence organizational learning by affecting contextual factors such as structure and environment, which in turn influence learning. They can also directly influence the organizational learning process. The introduction of information systems flattens the structure of the organization and promotes greater dissemination of information to all individuals. Through the internet, intranets, communities of practice, communities of interest, groupware etc. anyone in the corporation can talk to anyone else, almost at any time. These open, informal networks and multi-paths serve to partially equalize positional influence and emphasize the value of information and knowledge. These equalizers, if used effectively, will facilitate the evolution of the organization's culture toward learning and knowledge management objectives. The information technology should be

low-cost, support low-friction information and knowledge transfer and, over time, become an invisible part of the infrastructure.

Through the increased availability of information and the sharing of that information, the organization becomes more informed, flexible and organic. Information systems go beyond automating to "informating." (Zuboff, 1984) In an informated organization, the focus of control shifts from managers to workers, who are now empowered with all the information required for their effective performance. A number of current technology trends will help the organizational discernment and discrimination problem. Discernment and discrimination are elements of the organizations filtering process. Discernment is the ability to differentiate the meaning and value among multidimensional concepts; and discrimination is the ability to choose those things upon which the organization needs to focus.

Technology is moving beyond expert systems (which make logical inferences based on a fixed set of rules) to systems that combine the use of embedded textual information with human cognition and inference to maximize the decision-making and interpretation processes needed to understand and act upon messy, complex situations. Technologies such as network publishing on the Internet and the information superhighway can facilitate the creation of organizational repositories. These repositories not only capture formal documents such as training manuals, employee handbooks, training material, etc., but also informal experience such as tacit know-how, expertise, experiences, stories, etc., often ignored in organizations. The use of such information systems to support and enhance organizational memory (and learning) by improving the precision, recall, completeness, accuracy, feedback and review of informal knowledge complements well the human contribution to decision making—creativity, rational thinking, intuition, emotion and social synergy.

Leadership

The essential function of leadership is to provide direction, build an organization's culture and spirit and shape its evolution. Leaders must shape the design of the organization's structure and policies to best fulfill its corporate mission. To do this, they must model desired behavior, communicate the organizations vision and strategy and insist on effective implementation of requisite policies and procedures. Organizational learning also requires commitment from executives for a long-term process with adequate budget and resources. Organizational culture (beliefs, ideologies, values and norms) and the amount of resources (money, facilities, people and ideas) heavily influence the quality and quantity of learning.

Environment

Learning organizations treat competition as a means of learning, since competition enables organizations to compare their own performance with others in the industry and learn from that exercise. Through knowledge sharing, learning results as the organization interacts with its environment. Knowledge management looks to the external environment as a source of knowledge and as a testing ground for its understanding and interpretation of itself and the outside world. As part of a major feedback loop, the environment presents a standard for measuring the organizations learning, unfortunately, it can also be a harsh taskmaster for organizational mistakes.

AREAS OF INTERSECTION

Having addressed the broad areas of structure, strategy, technology and the environment, we now look at a number of specific areas where knowledge management and organizational learning intersect: Individual Learning and KM, Learning and Communities of Practice, Learning and Systems Thinking, and Learning and Flow.

Individual Learning and KM

Organizational learning is greatly dependent upon individual learning and the competency of the workforce. If the firm has a culture and leadership conducive to organizational learning, chances are that that same environment will also support individual learning. It is not so clear that KM facilitates individual learning since to date many KM efforts have emphasized technology and knowledge sharing rather than individual development. However, the culture of KM closely matches that needed for individual learning. Borrowing heavily from adult learning expert Malcolm Knowles, the main characteristics of adult learners are summarized below. (Knowles, 1998)

Adults want to learn more that just data and facts, they are interested in understanding "the why and how" of their information. Since most adults are not closely supervised, they see themselves as autonomous and self-directing. This same self-image becomes particularly strong when they are in a learning environment. Feeling that only they know how best they understand something, they do not want to be told what they need to know and how to learn it in a pedagogical manner, they want to take ownership for their learning. Adults use their prior experience and their mental models to make sense of new information and knowledge. This may prove beneficial or detrimental, depending on the validity of these past experiences. Spending much of their time solving problems at work, adults tend to prefer practical, goal-oriented problem solving in a realistic context versus textbook solutions. Preferably, these problems should relate directly to their current work and interests. Comfortable with work-place conversations, they tend to prefer learning through group discussions and dialogue rather than self-study.

From these learning characteristics it is clear that a successful knowledge management program would provide many of the conditions desired by knowledge workers, and by doing so greatly leverage learning throughout the organization. For example, KM builds a culture of knowledge sharing and open communication, both leading to an environment conducive to adult learning. Communities of practice, teams, knowledge repositories, intermediaries, yellow pages etc all support the autonomous worker to meet their own learning needs. A somewhat surprising consequence of KM is the awareness and instantiation of the importance and payoff of learning and knowledge in the minds of the organization's knowledge workers.

Learning and Communities of Practice

Communities of practice accelerate learning. The practice of COPs denotes a group with the same work focus, and therefore a group that has much in common in their every-day work life, including a common language. The community part of COPs denotes a group that has a relationship built on trust and a focus on the open sharing of ideas and best practices. In COPs the creating, learning, sharing and using of knowledge are almost indivisible. John Seely Brown and Paul Duguid explained this phenomena: "… talk without the work, communication without practice is if not unintelligible, at least unusable. Become a member of a community, engage in its practices, and you can acquire and make use of its knowledge and information. Remain an outsider, and these will remain indigestible." (Brown and Duguid, 2000)

Etienne Wenger, a thought leader in communities of practice and formerly of the Institute for Research on Learning, found that the group was important to both what people learn and how they learn. Within the group setting of claims processors, Wenger discovered that knowledge, traveling on the back of practice, was readily shared (Wenger, 1998). This same pattern was found from shop floors to professional fields, where scientists, doctors, architects, or lawyers, after years of classroom training, learn their craft with professional mentors. "Here,

they form learning communities capable of generating, sharing, and deploying highly esoteric knowledge." (Brown and Duguid, 2000)

Pinchot views community as an essential leadership skill. "A powerful community of work is essential to workplace happiness, to organizational loyalty, and to the high level of cooperation across boundaries that is essential in the information age." (Pinchot, 1998) Further, he states that to get their work done, "knowledge workers abandon the formal organizational structure and move into the informal organization," that of communities. (Pinchot, 1998)

Communities can facilitate both single-loop and double-loop learning. Focusing on a particular field, communities provide a thought test bed for creating and sharing better ways of taking actions, developing new processes, tools and methods, and the application of new management ideas. This is *single-loop learning*. (Argyris, Putnam and McLain Smith, 1985)

But the open exchange of ideas and interactions among members of the community may challenge the basic theory and belief about how the system works. In other words, when problems arise and never seem to be solved, the underlying theory of how the system works may be wrong. Or when the environment changes, the system must change to continue to meet its responsibilities. When this occurs, an entirely new understanding of the system's structure and what makes it behave the way it does must be reviewed and a new theory developed. This is *double-loop learning*. As mentioned earlier, this is the most difficult of all because it requires groups of people to change their understanding of their theory of success, to break through their defensive routines to accept and believe that a new theory of action is right and will work.

This is where communities have an advantage. Communities encourage the exchange of ideas, assumptions, and theories that open their members to new ways of seeing situations. The continuous, rapid feedback system of a community provides the opportunity to tie discussions and dialogues to decision results, generating new ways of understanding the system. Within the trusting framework of communities, individuals can observe other's results and rethink their assumptions and theories.

The value of learning in general, and double-loop learning in particular, will be to speed up the acceptance and application of new ideas, techniques, methods and tools that provide themselves in the workplace. Of special importance is the full acceptance of new ways of doing business that change roles and relationships among organizations and individuals. Relationships among manager-employee, colleague-colleague, community-community members, government-industry, headquarters-field activities, buyers-users will all change in one form or another**.** How effective these changes will be depends on the beliefs and actions of the individuals in each area. Learning and change are the primary forces for success because they are absolutely essential for adaptation, experimentation, and innovation. In today's world, every decade and every year we find new technologies, new rules and new environments which demand new perspectives, new insights and new actions.

In 2000 the American Productivity and Quality Center (APQC) conducted a detailed study on communities in order to understand their nature, their role, and how to create and successfully sustain them. The study included 40 organizations from many different industries. The size of organizations ranged from 100 to 900,000 employees. The introduction to the study results states: "The Findings are compelling evidence that communities are assuming a new role in knowledge work and KM systems. Community activities are also becoming embedded in the daily work of knowledge workers." (APQC, 2000) Provided as evidence of the rising importance of communities in the knowledge work of organizations, the study results showed

that 74 percent of responders reported that operating units rely on communities to provide knowledge resources. (APQC, 2000)

Learning and Systems Thinking

Systems Thinking and System Dynamics facilitate both individual and organizational learning. Systems Thinking, according to Peter Senge, is an approach to understanding complex systems (such as organizations) that have many elements and relationships. (Senge, 1990) Systems Dynamics is the technical side of systems thinking that provides the analytical techniques and the software for computer programming of the fundamental causal relationships within an organization that are identified by informed knowledge workers. Systems Thinking provides a conceptual process and a visual way of describing multiple causality relationships that include both positive and negative feedback loops, as well as time delays and nonlinear influences.

Systems Thinking encourages groups to dialogue and develop a common understanding of a complex problem within the organization and thereby, learn from each other and become better able to make decisions and implement them. Systems Thinking also helps restructure views of reality by identifying and challenging prevailing mental models and fundamental assumptions and by promoting double loop learning. In the process of understanding how organizations work, Systems Thinking encourages exploration of multiple viewpoints to any problem through dialogue and discussion. It is via such knowledge sharing and creation processes that knowledge management and organizational learning benefit each other.

There is another interpretation of Systems Thinking: Being aware of what systems are, what characterizes them and their general properties. Perspective and viewpoint are often critical to solving problems and understanding situations. A systems perspective permits one to see the organization, external threats or internal processes as systems with boundaries, elements, relationships, and networks of influence that provide insight and understanding of how the system works and how it will respond to a specific action. Learning by using the system perspective greatly facilitates the development of knowledge of both individuals and groups. It also puts each situation in its true place relative to other systems, permitting more effective priority setting and prediction of knowledge application.

The best organizational learning is distributed throughout the firm such that from a backdrop of continuous learning to meet routine challenges, teams and processes can, when called upon, arise to anticipate and meet fundamental threats and opportunities that challenge the organization. This means that learning must be local and distributed, and it must be both continuous and episodic. These demands may strain knowledge workers and their managers, since they require living with change and uncertainty relative to both what needs to be learned, how fast it must be learned, and how to apply such new knowledge. This highlights the difference between learning and knowledge processes. While there are generic knowledge processes such as knowledge creation, sharing, and storing that may be described in general with some assurance, successful learning processes are mostly local and depend upon the history, nature, local culture, and leadership needs of the firm, and on the learning styles and recent experience of both its knowledge workers and the teams they make up. Knowledge managers must be sensitive to the locality of effective learning and to the unpredictable nature of many learning situations.

A fundamental requisite to learning is the attitude and motivation of the individual knowledge worker. While knowledge managers may influence individual attitude and motivation, the amount of such influence is limited. Given this limitation, what knowledge

managers can do is to support individual learning and organizational learning through the effective nurturing of culture, infrastructure, technology, policies and personal behavior. In today's changing, uncertain and complex business environment, knowledge organizations must be learning organizations and knowledge managers must therefore recognize and accept the responsibility of building and maintaining an organization that treats learning as a key success factor and is an integral part of the normal KM areas of concern. Knowledge managers must also be sensitive to the individual and group needs and capabilities of knowledge workers as they relate to learning, changing, risk taking, innovation and courage.

Learning and Flow

Organizations flourish with the flow of data, information and knowledge, the flow of people across and in and out of the organization; and flow in terms of the optimal human experience. In a learning-centric organization, learning and knowledge that is core to the business of the organization are captured and shared. The more learning is valued in the organization, the better its core knowledge flows and grows through innovation, mission performance, and the creation of new knowledge. While each individual is important to this process, it is the continuous flow of knowledge and learning among people that generates organizational learning. This continuous flow is facilitated through the movement of people in and out of networks; communities of practice and workgroups as they change jobs, change their priorities and interests, and grow in new areas of thought. Even better than teams, this fluid movement of people in and out of communities of practice and networks creates diversity of perspectives and ideas, bringing together new combinations of knowledge and learning that offer ever increasing opportunities for discovering better ways of taking action and achieving their organizational mission.

Considerable work is emerging on the science of knowledge flow within organizations. Nonaka considers knowledge flow through four steps. Since he states new knowledge is created only by individuals and is necessarily tacit in nature, this flow occurs through a process of *socialization*, with members of a community sharing their experiences and perspectives. (Nonaka, 1994) A second flow occurs through *externalization*, where the use of metaphors, stories and dialogue leads to the articulation of tacit knowledge, converting it to explicit knowledge. A third flow occurs through *combination*, where community members interact with other groups across the organization. A fourth flow occurs through *internalization*, where individuals throughout the organization learn by doing and perhaps even through listening to stories are able to create knowledge, usually in tacit form. When all four of these processes coexist, they produce knowledge spirals which result in accelerated organizational learning. (Nonaka and Takeuchi, 1995)

Optimal flow is a psychological state identified by Csikszentmihalyi as one in which an individual, while actively performing some task, looses track of time and easily and naturally makes use of all of their experience and knowledge to achieve some goal. Within an organization, these three forms of flow can work together to activate and accelerate both creativity and cohesion of action. High personal productivity, useful dialogue and knowledge sharing, when coupled with new employees having different perspectives and asking challenging questions, will create an organizational synergy that moves the knowledge-based organization to achieve its best performance.

Although flow and knowledge spirals are knowledge management concepts, one can easily appreciate their power to support and facilitate organizational learning. Although learning

is inherently an individual experience, that experience can be significantly influenced to help the individual and the organization learn and create knowledge.

THE LEARNING CONTINUUM

John Seely Brown and Paul Duguid view learning as a social phenomenon. (Brown and Duguid, 2000) Certainly looking at "social" as of, relating to, or occupied with matters affecting interactions, discourse and human welfare, we agree fully. The social phenomenon of learning is not only among individuals, but among any individual and the environment, whether that environment consists of people, places, processes or things; whether it is silent or active; whether it is defined in terms of the individual with a negative or positive influence.

We have focused on, and talked about the importance of both learning and knowledge management throughout this paper. Indeed, knowledge on the subjects of organizational learning and knowledge management has become increasingly important as a point of focus for the business world driven by the development of the Internet and virtual worldwide access to the exponentially increasing amount of data and information. Since knowledge is situationally dependent, i.e., what is understood as knowledge relates to some specific domain, situation and context, a changing environment insinuates changing knowledge needs. Learning is the individual and organizational process for creating new knowledge to meet changing environments.

Figure 1 explores the learning continuum from an individual or organization highly interactive with its environment, in the flow state, to an individual or organization whose thinking and actions have become locked, or static, and therefore continuously diminishes in effectiveness as the environment changes. For ease of explanation, the model will be discussed in terms of organizational learning. As an organization realizes the value of a product or process, it tends to freeze that process or product in time. This occurs for a number of reasons such as the need to train, limited funding, or temporary success. Perceived competitive advantage also causes a locking in as new products/processes move into a mature phase where the focus is on sales and/or implementation. If the organization has healthy feedback loops in place and responded to, the organization moves in and out of learning cycles to periodically develop and produce new versions of the product/process.

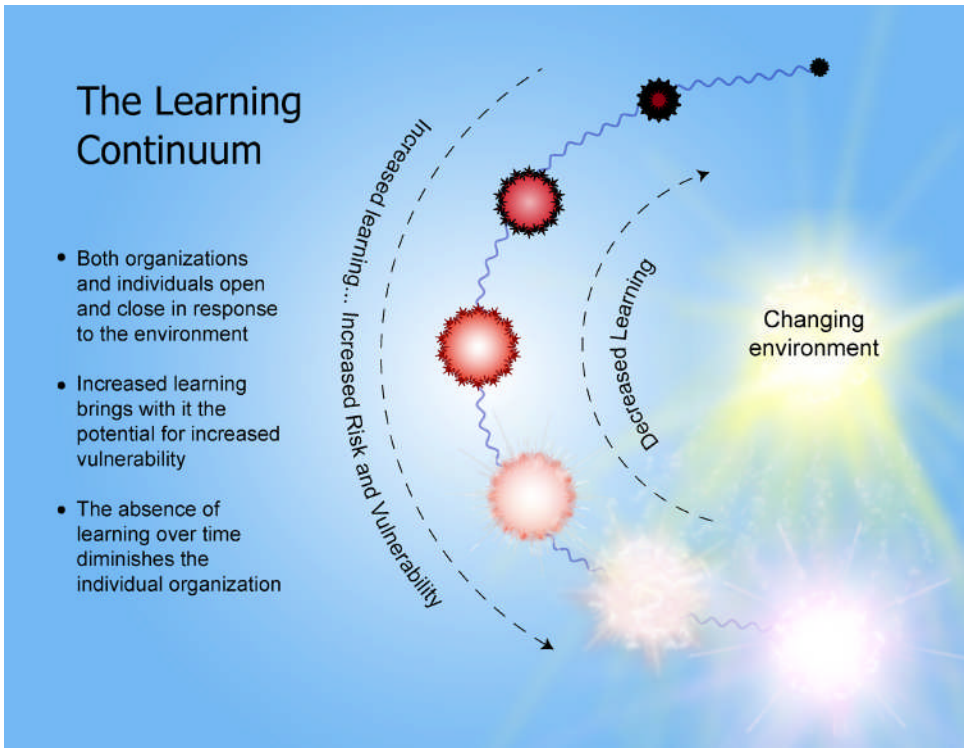

Figure 1

The organization just described sits in the middle of the learning continuum as it markets and implements its process/product, and moves down along the continuum as it receives feedback from its environment, learns from that feedback, and creates an improved version of its product/process. The innovative development environment, discussed in case studies of Apple Computer, lays further down along the learning continuum. (Drucker, 1985) The Apple organization was highly open and interactive with its environment, with minimal locking in of products/processes. The furthest learning point along this continuum represents the state of Flow introduced by Csikszentmihalyi, where there is a fluid exchange among the environment, the organization and individuals within that organization. In the Flow state, autotelic work, work whose purpose lies within the individual and is done for its own sake, is both a goal and a reality.

Moving upward along the continuum, still using an organizational scenario, the organization is achieving enough continuing success with its product/process that it does not recognize the need for change and remains locked into that product/process. In fact, in a large customer base, this success may continue for a number of years (dependent on how rapidly the organization's areas of focus is changing) as front-runners move on to new and better processes and products, followers move in behind them to continue purchasing/using the offered product/process. However, over time, the product/process will diminish in value and the market will look to new ideas and products/processes for satisfaction. When this happens it is usually too late to catch up with alert and more nimble competitors who have continued growing themselves and their products/processes.

Another way to use the learning continuum model is to reflect on the fit between individuals and the organization within which they work. If an organization is locked into a product/process and in the distribution mode, it would be difficult for an individual who operates near a state of flow to flourish. In like manner, for an individual who has locked onto a specific

set of beliefs and work habits, it would be difficult to succeed in a learning organization that fluctuates and bounces in response to the environment.

Taking a systems view of relationships among organizations and the people who work within those organizations, to succeed in organizational structures built on the bureaucratic model, it is necessary to have the ability to solidify ideas and slowly work them into the system. Simultaneously, to respond to the fluctuating environment, it is necessary to have the ability to be open to interact with that environment, and learn from it. This points to the need for individuals and organizations to develop a capability to move in and out of learning modes, although that movement along the continuum will be burdened by capacity and culture. Still, the ideal condition is the ability of individuals and organizations to choose where to function on the continuum at a specific time and in a specific situation. It must be noted, however, that there is a limit to the amount of flexibility an individual or organization can achieve. The further an individual or organization moves to either end of the continuum, and the longer he/she/it remains in that mode, achieving a comfort level, the more difficult it becomes to move away from that comfort level, the irony of a learner being unable to learn how to learn. In all things there is a balance, a region within which movement assures strength and stability without rigidity or undue risk.

On the other hand, while an organization (or individual) is in an increased learning mode, there is also increased risk and vulnerability. This is due to the large amount of interaction with the environment that provides both negative and positive data and information, and the increased need for greater discernment and discretion. In organizational terms, this may be thought of as the need for increased discrimination capability in a world with porous and permeable boundaries, where a large amount of data and information flows into the organization and much of it is irrelevant or false. *What* the organization learns may be more important than how fast it learns. In fact, an organization may become saturated with learning and fall into the trap of always trying something new without discerning the learning that is applicable to its immediate needs.

The selection and validation competency (discretion and discernment) developed by a high quality knowledge organization can focus learning in the right directions to reduce error signals, confusion and wasted effort. Recall that knowledge is the capacity to take *effective* action. The word effective is significant because of the inundation of possibilities and the chaotic nature of events in the environment of many extant firms. To learn to take effective action means to learn all of the right things, to unlearn those things that prohibit the right actions and not fall prey to educated incapacity. Recall that knowledge is the capacity to take effective action and learning provides the continuous creation and updating of knowledge. Taken together, knowledge management and organizational learning provide the foundation for leveraging the full value of the organization's human resources.

Final Thoughts

As uncertainty and complexity increase in the future, and decisions become more challenging, individual, group and organizational learning, coupled with a strong knowledge management program offers the best capability an organization can have to change, adapt and influence its environment in a way that maximizes its performance over time. This statement is the crux of a 350-page book entitled *Organizational Survival in the New World: The Intelligent Complex Adaptive System* that will be published by Butterworth-Heinemann in October 2003. Bennet and Bennet make the case for a new theory of the firm built on the Neo Darwinian fitness model where the organization is designed to continuously adapt to and co-evolve with its

environment. At the core of this organization are the knowledge worker, learning and knowledge. (Bennet and Bennet, 2003) Within the organization, focused, flexible and friendly communities will help knowledge workers continually learn and change. By combining the strengths of organizational learning and knowledge management, smart organizations will create cultures, structures, and leadership styles that enable them to scan, perceive, evaluate, anticipate and take effective action on new, ambiguous, unexpected and complex threats and opportunities. Achieving such an ideal is as challenging as it is productive.

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