Developing Learning Organization Strategy for Online Education: A Knowledge Perspective

Kam Hou VAT
Faculty of Science & Technology
University of Macau, Macau
fstkhv@umac.mo

ABSTRACT

This paper describes the initiative to develop a learning organization strategy for online education services from the perspective of participatory knowledge construction. The strategy is intended to create networked collaborative training experiences that invite students to construct knowledge and to make meaning of their worlds of learning. In particular, we discuss the educational framework of our design from the perspectives of cultivating an organization's collective intellect in the form of communities of practice. We also describe the incremental process to realize this strategy through the viewpoint of technology change management. The paper concludes by discussing the challenge of integrating processes and knowledge in online education through blending the art and science of teaching and learning into creative system design and engineering.

KEYWORDS

Learning Organization, Communities of Practice, Technology Change Management

INTRODUCTION

As online technologies and information resources rise in salience, it is believed that online education must be based on theories of learning and instructional design principles to guide usage of the tools and resources for mediating collaboration and social exchanges within communities of learners. Recent discussions in the literature [4, 12, 15, 23] suggest that learning is increasingly viewed as a constructive process occurring during one's participation in and contribution to the practices of the community. This is supported by a current shift [3, 18] from the cognitive focus on knowledge structures presumed in the mind of the individual learner, to a constructivist focus on the learner as an active participant in a social context. Indeed, we have been witnessing classroom culture being enriched with tools (WWW-based tools) that mediate knowledge building and social exchanges among peers as participants in discourse communities [1, 2, 5]. These communities open opportunities for learners to interact with multiple perspectives that challenge their existing knowledge constructions and impose cognitive conflicts [16] requiring negotiation. The theme of this paper is to investigate strategies to enhance learning and knowledge sharing in the learners' communities referred to as the *communities of practice* (CP) through the idea of Learning Organization (LO). Its aim is to develop the collective intellect of the CP in terms of its social and intellectual capital, through the appropriate use of information and communications technology (ICT) components so as to expand its capacity to adapt to future challenges.

THE CONTEXT OF REFERENCE

In the fall of 2000, a group of former students from our undergraduate Software Engineering program, initiated an interesting conversation with the author, to exchange their experience after graduation as one of the continuing activities of our informal study group (ISG) [22]. And we started exploring the formal training they receive from their companies, some of which comprise just a few employees who have a strong need for rapid and continuous training. During the discussion, the author was made aware that most companies now face a critical problem of low capacity for endogenous growth. According to Trentin [21], such growth is typically acquired in two ways: by capitalizing on and spreading throughout the firm the know-how and tacit knowledge that individual staff members have gained through direct experience; and by recruiting new expertise that the company lacks. These issues indeed give rise to the company's need to train, update, and often retrain staff to ensure that the company does not fall behind in the competitive market. However, except for large corporations with strong well-invested internal training divisions, small companies tend to opt for either or both of the two possible paths. They

are: (1) sending staff to training courses held outside the company by public training bodies, universities, specialized training centers, or large corporations capable of passing on their expertise; and (2) calling on outside experts and specialists to provide workplace training on company premises. In either case, the course provider can decide whether to adopt a face-to-face approach, distance education, or a combined onsite/online strategy which mixes onsite activities with individual study and thus allows distance interaction among participants between one onsite event and another. From an instructional designer's viewpoint, the stages comprising such formal training could include: identification of training needs, education design, production of learning material and a possible proposal for online activities based on online education strategies, and course delivery over a medium to long time span. Yet, the situation of concern is that no matter how rapidly these stages are conducted, the process from needs identification to completion of formal training will inevitably be too lengthy for the modern companies which are forced to react practically in real time. More, we must have this requisite: the availability of people who are capable of acting as training mediators, of building a bridge between a company's training needs and the educational resources for meeting them. It has been reported [20] that this need for externally managed training often arises where the organization's endogenous growth is lacking. This analysis is indeed applicable in the university context where we have witnessed an enormous potential for transforming education to meet the growing need for customized, on-demand life-long learners. But we have yet to find a new strategy of knowledge production, delivery, and presentation, which could combine an individualized approach, flexibility, and ease of dissemination without sacrificing the effectiveness of learning. It is believed that such a strategy should offer learners the technological and pedagogical possibilities to collaborate with participants and experts all over the world via the World Wide Web (WWW or Web) and to access online resources integrated into the study materials. Likewise, if our universities were to retain their longstanding position as our intellectual watering holes in the coming waves of new technological possibilities, we need a working strategy to enhance our endogenous growth.

CULTIVATING COMMUNITIES OF PRACTICE

In facilitating the endogenous growth of an organization, the idea of communities of practice (CP) has inspired many companies, consortia and even groups of individuals with common professional problems to initiate networked collaborative training approaches [13, 19, 24, 25]. These are based on a simple but powerful concept: to create communities that ground their professional growth on mutual learning processes. Basically, if a problem arises, help can be sought from someone who is likely to have already tackled that problem. If the suggested solution is understood, learning has taken place, which will then increase know-how to be distributed among the community members. Even if no immediate solution is found, it is possible to seek allies in the search for one. This collaboration will bring about collective growth in the community and problem solving is thus aimed to increase the community's shared knowledge base. Lev Vygotsky's theory [23] suggests that we learn first through person-to-person interactions and then individually through the internalization process that leads to deep understanding. This belief in the social process of knowledge sharing permeates today's interactive classroom led by skillful teacher intervention. What is certain about the emergence of ICT tools is that we now have the technological means to provide continuity and to optimize communication within groups of individuals outside face-to-face meetings or informal discussion. ICT enables CP's to do circulation of information and material (explicit knowledge) or of opinions, suggestions, and know-how (tacit knowledge) that have not been codified in a text/manual or other support channel. According to Nonaka and Takeuchi [14], explicit knowledge can be expressed in words and numbers, and can be distributed as data, scientific formulae, product descriptions, manuals, or basic principles. And it is easy to transmit in definite and organized form, to manage on a computer, communicate by network and store in a database. In contrast, tacit knowledge is highly personal and difficult to define, which also makes it hard to communicate and share. It embraces subjective perception, intuition and foresight, and is firmly rooted in personal experience. In order to spread tacit knowledge within an organization, it needs to be transformed that everyone can understand. And it is this very act of conversion from tacit to explicit that organizational knowledge is created. Hence, endogenous growth within an organization is strictly linked to this capacity to create new knowledge, to spread that knowledge among its staff and to incorporate it in the products and services it offers [13, 21]. The critical success factor is to get people to communicate. And CP presents a theory of learning that is based on the following assumptions [24, 25]:

a) *Learning is fundamentally a social phenomenon.* People organize their learning around the social communities of which they are members. Engagement in social practice is the fundamental process by which they learn and so become who they are. Schools are powerful learning environments only for individuals whose social communities coincide with the school.

b) *Knowledge is integrated in the life of communities that share values, beliefs, languages, and ways of doing things.* The primary unit of analysis is the informal "communities of practice" that people form as they pursue shared enterprises over time. Real knowledge is integrated in the doing, the social relations, and the know-how and expertise of the communities.

c) *The process of learning and the process of membership in a CP are inseparable.* Learning is inseparably entwined with membership in a CP. What holds them together is a common sense of purpose and a real need to know what the other knows. As they change their learning, their identity (relationship to the group) changes.

DEVELOPING LEARNING ORGANIZATION COMPONENTS

On conceiving the organizational framework to accommodate CP's development, we find the notion of learning organization (LO), quite compatible for our exploration. According to Garvin [6], LO refers to an organization skilled at creating, acquiring, and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights. King [9, 10] supplements this notion with the idea of organizational results, and considers an LO as one that focuses on developing and using its information and knowledge capabilities in order to create higher-value information and knowledge, to change behaviors, and to improve bottom-line results. In other words, LO represents the important concept of better knowledge for better behavior for better performance. And we have considered a number of components that can be developed and implemented in the pursuit of a LO-based strategy in support of online education.

a) *IS-related Component.* The field of information systems (IS) [9, 10] operates on the paradigm of identifying relevant data, acquiring it, and incorporating it into storage devices (databases) that are designed to make it readily available to users in the form of routine reports or responses to inquiries. Principally, IS directly relates to managing data and information rather than to knowledge and learning. But, the IS infrastructure, including application programs which transform data into more valuable information relating to particular decisions, functions or activities in the organization, is of fundamental importance to implementing any of the other knowledge-related organizational components. An organization that chooses to employ an IS-related component in pursuit of a LO does so by creating databases, inquiry capabilities, communication capacities and other leading-edge infrastructure elements to enable and facilitate collective learning, information sharing, collaborative problem solving and innovation.

b) *IPM-related Component.* The field of intellectual property management (IPM) [26] deals with the activities that are involved in leveraging existing codified knowledge assets in the form of patents, brands, copyrights, research reports and other explicit intellectual property of the organization, to create additional value. This is accomplished by creating repositories of explicit knowledge and refining and distributing it through the IS infrastructure. The conceptual basis for this component is that such codified knowledge may be thought of as a capital asset to maximize return from intellectual property. The organization that pursues the IPM component to create a LO may devise a financial incentive that allows individuals and groups to be rewarded for the creation and leveraging of such property.

c) *IL-related Component.* The individual learning (IL) component focuses on the training and education of individuals. The emphasis is to enhance the value of the organization's human capital. This approach maximizes the opportunities for both formal and informal learning through the institution of workshops, development programs, apprenticeship programs and the establishment of informal mentoring programs. The conceptual basis is that an effective IL component requires focus on both explicit and tacit knowledge. While explicit knowledge can be transmitted formally, the transfer of tacit knowledge (existing in the minds of the experts) can be observed only through its application and can be acquired only through practice [7]. The organization that adopts the IL component in pursuit of a LO is betting on its people; namely, enhanced individual learning will translate into improved organizational behaviors and performance.

d) *OL-related Component.* The organizational learning (OL) component focuses on the idea that learning by a social system cannot be equated with the sum of the learning processes undergone by individuals [17]. This component may be thought of as pursuing the creation of social capital in the organization. The conceptual basis is that social capital, in the form of various group and organizational competencies and capacities, can be developed, refined, and enhanced to enable the organization to adapt to changing circumstances and demands, through such processes as teamwork, empowerment, case management or development-focused career paths. The organization that pursues the OL component to create a LO, must facilitate group learning and group capacities for dealing with change so as to enhance the organization's ability to respond to change.

e) *KM-related Component*. The knowledge management (KM) component focuses on the acquisition, explication, and communication of mission-specific professional expertise that is largely tacit in nature to organizational participants in a manner that is focused, relevant and timely [7, 9]. The conceptual basis is that tacit knowledge can, in part, be made

explicit, and leveraged through the operation of KM-related processes and systems developed for knowledge sharing. The organization that employs the KM-related component to create a LO, must embrace such processes as best practices, expert networks, self-directed work-groups and communities of practice.

It is believed that each of the above components represents a viable way of beginning the pursuit of a learning organization. Yet none of them alone is likely to be sufficient to mature the efficacy of an online education strategy of knowledge production, delivery, and presentation as in a university context. In order to support the effectiveness of learning, afforded by some technological and pedagogical possibilities to collaborate with participants and experts over the Internet to access knowledge resources, we need some combination of the enumerated LO-based components (plus others to be innovated). This suggests that the online education environment in the form of an evolutionary LO, is a function of many complex factors, including possibly a well-conceived time-phased plan in which individual LO-based components are implemented and allowed to mature before new and quite different components are introduced into the mix. Trying to capture this complexity onto the design of our online education environment, is more an ongoing iterative process than a one-time activity. Nevertheless, we do have a present road map to set off our refinement process. As mentioned, the IS-component provides a foundation for each of the other components. Once the IS infrastructure has been developed, the environment can more effectively implement other components such as the IPM-component. The logic of making this the second element of the overall plan is that it also focuses primarily on infrastructure, and it has the potential to produce financial incentive that can be used as a basis for the motivation of individuals when the other components are implemented. The third is preferably the IL-component because it focuses on human capital, creating a strong people-based foundation for the more sophisticated learning strategies. It also provides a fertile base for the future implementation of the OL-component, which focuses on the creation of social capital. The KM-component is a natural evolutionary step in the pursuit of the goal of a LO because KM activities such as communities of practice, expert networks, and electronic workspaces naturally evolve from the social context of organizational learning coupled with the technical capabilities provided by the IS.

ADOPTING TECHNOLOGY CHANGE MANAGEMENT

We believe that we are poised for composing learning organizations, and thus a LO-based strategy in support of online education. But frameworks and tools must pull together process, knowledge and technology to support learning and successful change. Organizations are increasingly recognizing the need for specific implementation guidance when they adopt new technologies, processes, and methods, as in the case of developing online education. The improvement efforts from face-to-face classroom meeting to the provision of online learning are so complex and their effects so far reaching that they require a specialized, systematic approach for managing the technology adoption life cycle. This is the idea of technology change management [11]. The IDEAL model providing a disciplined engineering approach fits in just right. It was originally conceived as a life cycle model for software process improvement based on the Capability Maturity Model (CMM) for software at the CMU-SEI [8], and has later been revised for broader applications. IDEAL now provides a usable, understandable approach to continuous improvement by outlining the steps necessary to establish a successful improvement program. Following the phases, activities, and principles of this model has proven beneficial in many improvement efforts. The model consists of five phases. Initiating (I) is to lay the groundwork for a successful improvement effort. Diagnosing (D) is to determine where we are relative to where we want to be. Establishing (E) is to plan the specifics of how we will reach our destination. Acting (A) is to do the work according to the plan. Learning (L) is to learn from the experience and improve our ability to adopt new technologies in the future.

a) *The Initiating Phase.* Critical groundwork is completed during this phase. The business reasons for undertaking the effort are clearly articulated. The effort's contributions to business goals and objectives are identified, as are its relationships with the organization's other work. The support of critical personnel is secured, and resources are allocated on an order-of-magnitude basis. Finally, an infrastructure for managing implementation details is put in place. The simple reminder for the sequence of tasks in this phase is "stimulus for change | set context | build sponsorship | charter infrastructure."

b) *The Diagnosing Phase.* The diagnosing phase builds upon the initiating phase to develop a more complete understanding of the improvement work. During this phase, two characterizations of the organization are developed: the current state of the organization and the desired future state. These organizational states are used to develop an approach for improving business practice. The reminder of task-sequence in this phase is "characterize current and desired states | develop recommendations."

c) *The Establishing Phase.* The purpose of this phase is to develop a detailed work plan. Priorities are set that reflect the recommendations made during the diagnosing phase and the organization's broader operations, as well as the constraints of its operating environment. An approach is then developed which honors and factors in the priorities. Finally, specific

actions, milestones, deliverables, and responsibilities are incorporated into an action plan. The reminder of task-sequence in this phase is "set priorities | develop approach | plan actions."

d) *The Acting Phase.* The activities of the acting phase help an organization implement the work that has been conceptualized and planned in the previous three phases. These activities will typically consume more calendar time and more resources than the sum of the other phases combined. The typical task-sequence include: "create solution | pilot/test solution | refine solution | implement solution."

e) *The Learning Phase.* The learning phase completes the improvement cycle. In this phase, the adoption or improvement experience is reviewed to determine what was accomplished, whether the effort met the intended goals, and how the organization can more effectively or efficiently implement change in the future. Addressing any and all of these concerns represents active learning. And records must be kept throughout the IDEAL cycle with this phase in mind. The reminder of task-sequence is "analyze and validate | propose future actions."

As a whole, the IDEAL model reinforces learning through the concept of continuous process improvement, and one of its goals is to continuously improve the ability to implement change. This represents the fusion of technology innovation and process and knowledge management as it is fully defined, operationalized, and enacted in a learning organization.

INTEGRATING KNOWLEDGE AND PROCESSES IN ONLINE EDUCATION

We note that constructing online learning environments requires that we apply knowledge and capability in related areas, such as process management, knowledge creation, systems thinking, group dynamics, educational principles, and community memory – recording and analyzing decision making and related history – for recurring and problematic themes ready to be streamlined. Together, these comprise the backbone for communication and cooperative work necessary for online education. Yet too often, we observe a premature inclination to jump to a technological solution without paying attention to those basics. For example, development teams may be overly eager to automate processes that have not been fully defined or used in manual operations. These tendencies reveal wishful thinking that adding technological support will magically allow users to bypass a host of needs and constraints. We need to stimulate new CP's made up of people and organizations experienced in technology implementation, cooperative work, organizational learning, and process initiation and improvement supported by leveraging individual knowledge through information exchange and by reconciling diverse perspectives. A LO-based strategy for online education should establish the capability to understand its environment, including its current activities and work processes, to evaluate what is understood and to initiate improvements where necessary. This capability enables decision making and affects outcomes, representing the combined experience, expertise, and knowledge of all participants involved in a group activity. The meta-processes centered on this capability to learn, according to Levine [11], are both independent of and dependent on the people in the concerned organization.

a) *Independent.* Organizations are independent of their members because work processes may exist long after people have left the organization or before new people have come on board. Moreover, viable and effective processes are not dependent on extraordinary individuals to carry them out. By mobilizing multiple perspectives, experiences, and expertise from across an organization and channeling these for decision making, the organization, as a whole, can monitor relevant environmental conditions, continuously adapting its processes to satisfy changing technical and business needs.

b) *Dependent.* Organizations are dependent on their members and the free flow of ideas. These interactions form the creative source for organizational learning and are the necessary conditions for the ongoing viability of the processes that are created. Interactions through talk, stories and documents sharing, serve a dual role (information bearing and social bonding). To reap the potential benefits of such interactions, through which members of different projects or programs contribute to the same discussion or branched threads, it is believed that most organizations will have to undergo some structural and cultural changes. And such changes often cannot happen overnight.

CONCLUDING REMARKS

Now that we basically learn primarily from discrete events in which we are involved, the LO-based support in our online education is developed incrementally through a user-driven iterative collaboration process, which involves our instructional designers, teachers, and students. Using the learning organization as a concrete example, we consider online education as a scheme to operate a form of community memory, gathering and distributing data, information and knowledge across the organization. In such learning environments, information systems are geared to improve the interactions between knowledge

seekers and the various forms of information providers and knowledge creators. Four basic processes in knowledge asset management are identified [14]: develop new knowledge, secure new and existing knowledge, distribute knowledge and combine available knowledge. Our environment should make recorded knowledge retrievable or make individuals with knowledge accessible to help learning and adaptation, and the LO-based strategy should help facilitate this and provide the right context for dialogue to enable individuals and groups become observers of their own thinking. As a pervasive infrastructure, it is also believed that our online education environment should provide the conceptual framework for the integration of information and knowledge technologies from rigid forms of information technology (e.g. databases) to systems supporting dynamic, non-structured, self-evoking knowledge networks (conceptual/cognitive mapping). A measurable challenge is to provide conceptual and IT-based tools that support meaningful connectivity and navigation through these knowledge networks. Overall, our online education strategy is necessary to help organizational members sense and make sense of the environment, foster diversity, document and remember, make decisions and solve problems in a collaborative fashion, namely, 'learning in action'.

REFERENCES

[1] Bonk, C., Medury, P., and Reynolds, T. (1994), "Cooperative Hypermedia: The Marriage of collaborative Writing and Mediated Environments," Computers in the Schools, 10 (1 & 2), pp. 79-124.

[2] Bonk, C., and Reynolds, T. (1997), "Learner-Centered Web Instruction for Higher-order Thinking, Teamwork, and Apprenticeship, " In B.H. Kahn (Ed.), Web-based Instruction (pp. 167-178). Englewood cliffs: Educational Technology Publications.

[3] Brown, A.L., Ash, D., Rutherford, M., Nakagawa, K., Gordon, A., & Campione, J.C. (1993), "Distributed Expertise in the Classroom," In G. Salomon (Ed.), Distributed Cognitions: Psychological and Educational Considerations (pp. 188-228). New York: Cambridge University Press.

[4] Cobb, P., and Yackel, E. (1996), "Constructivist, Emergent, and Sociocultural perspectives in the Context of Developmental Research," Educational Psychologist, 31(3/4), pp. 175-190.

[5] Fabos, B., and Young, M. (1999), "Telecommunications in the Classroom: Rhetoric versus Reality," Review of Educational Research, 69 (3), pp. 217-259.

[6] Garvin, D.A. (1993), "Building a Learning Organization," Harvard Business Review, 71 (4), pp. 78-91.

[7] Grant, R.M. (1996), "Toward a Knowledge-Based Theory of the Firm," Strategic Management Journal, 17 (Winter Special Issue), pp. 109-122.

[8] Gremba, J., and Myers, C. (1997). The IDEAL Model: A Practical Guide for Improvement. Bridge, Pittsburgh, PA: Software Engineering Institute. Also at http://www.sei.cmu.edu/ideal/ideal.bridge.html.

[9] King, W.R. (1999), "Integrating Knowledge Management into IS Strategy," Information Systems Management, 16 (4), Fall 1999, pp. 70-72.

[10] King, W.R. (1996), "IS and the Learning Organization," Information Systems Management, 13 (3), Fall 1996, pp. 78-80.

[11] Levine, L. (2001), "Integrating Knowledge and Processes in a Learning Organization," Information Systems Management, Winter 2001, pp. 21-32.

[12] Marshall, H. (1996), "Recent and Emerging Theoretical Frameworks for Research on Classroom Learning: Contributions and Limitations," Educational Psychologist, 31(3/4), pp. 147-244 (complete issue).

[13] Nonaka, I, and Konno, N. (1999), "The Concept of Ba: Building a Foundation for Knowledge Creation," In J.W. cortada & J.A. Woods (Eds.), The Knowledge Management Yearbook 1999-2000. Boston: Butterworth-Heinemann.

[14] Nonaka, I., and Takeuchi, H. (1995). The Knowledge-Creating Company. New York: Oxford University Press.

[15] O'Connor, M.C. (1998), "Can we trace the efficacy of social constructivism?" In P.D. Pearson & A. Iran-Nejad (Eds.), Review of Research in Education, 23, pp. 25-71.

[16] Piaget, J (1952)., The Origins of Intelligence in Children. New York: Norton.

[17] Probst, G. and B. Buchel (1997), Organizational Learning: The Competitive Advantage of the Future, Prentice-Hall (Europe), Herdsfordshire, UK.

[18] Scardamalia, M., and Bereiter, c. (1996), "Adaptation and Understanding: A Case for new cultures of Schooling," In S. Vosniadou, E. De Core, R. Glaser, & H. mandl (Eds.), International Perspectives on the Design of Technology-Supported Learning Environments (pp. 149-163). Mahwah, NJ: Lawrence Erlbaum Associates.

[19] Takeuchi, H. (1998), "Beyond Knowledge Management: Lessons from Japan," http://www.sveiby.com.au/LessonsJapan.htm.

[20] Trentin, G. (2001), "From Formal Training to Communities of Practice via Network-Based Learning," Educational Technology, March-April, pp.5-14.

[21] Trentin, G. (1996), "Online Education and In-service Training, " In Proceedings of the International Conference on Lifelong Learning for the Information Society, pp. 44-48.

[22] Vat, K.H. (2000), "Training E-Commerce Support Personnel for Enterprises through Action Learning," In Proceedings of the 2000 ACM SIGCPR Conference, Chicago, Illinois, USA, Apr. 6-8, pp.39-44.

[23] Vygotsky, L.S. (1978), "Mind in Society: The Development of Higher Psychological Processes," Cambridge, MA: Harvard University Press.

[24] Wenger, E. (1998), Communities of Practice. Cambridge: Cambridge University Press.

[25] Wenger, E. (1996), "Communities of Practice: The Social Fabric of a Learning Organization," Helthcare Forum Journal, 39 (4), pp. 20-26.

[26] Wiig, Karl, M. (1997), "Integrating Intellectual Capital and Knowledge Management," Long Range Planning, 30 (3), June 1997, pp. 399-405.