Knowledge Management Technologies and Higher Education Processes: Approach to Integration for Performance Improvement

JUDE T. LUBEGA[*]
School of Computing and Informatics Technology, Makerere University
*WALTER OMONA**
Institute for Computing and Information Sciences, Radboud University Nijmegen
THEO VAN DER WEIDE
Institute for Computing and Information Sciences, Radboud University Nijmegen

ABSTRACT

The adoption and use of technology to support higher education processes has been increasingly affected by knowledge management (KM), learning technologies and emerging support tools for performance improvement. To achieve their goals, higher education institutions must endeavor to align operational processes and organizational learning with KM technology solutions to create a performance improvement environment that strategically leverages KM technologies with higher education processes. Drawing from the concepts based on processes reengineering in higher education, task-technology fit theory and an integrative learning and performance architecture to form the basis for defining our approach, this paper proposes a theoretical approach for integrating KM technologies in higher education processes with a view to achieving improved service deliveries and sustained competitive advantages. By using the reflections from the above concepts to show the links between KM technologies, higher education processes and performance improvement, this paper does not only give guidance for integration of KM technologies in higher education processes, but also act as a catalyst for optimizing higher education process modeling development.

Keywords: Knowledge management; Technology; Higher education; Process improvement; Integration

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1. INTRODUCTION

Institutions of higher education are currently at the forefront of the technological interface with life and society, and such technological innovations are nurturing in new educational approaches and debates concerning the appropriate use of new technologies. Because of the increasing complexity of the higher education environment, the increasing pace for change, the rising pressure in competition, and the increasing levels of workloads and other socio-technical problems, there is urgent need to link KM technologies in organizational learning with higher education processes to achieve improved outcomes. These require organizations to acquire new

[*] Jude T. Lubega, School of Computing and Informatics Technology, Makerere University. P.O. Box 7062, Kampala. jlubega@cit.mak.ac.ug
Walter Omona , Institute for Computing and Information Sciences, Radboud University Nijmegen. Heyendaalseweg 135 Toernooiveld 1, 6525 AJ. The Netherlands E-mail: womona@cs.ru.nl * Corresponding author
Theo Van Der Weide, Institute for Computing and Information Sciences, Radboud University Nijmegen. Heyendaalseweg 135 Toernooiveld 1, 6525 AJ. The Netherlands E-mail: tvdw@cs.ru.nl

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knowledge and approach of managing KM technologies such that it will transform their operation and processes in a continuous fashion for survival, growth and development [van Eijnatten and Putnik 2004; Stacey 2003].

Firestone and McElroy [2004] link individual and group learning to knowledge processes which are broadly classified as knowledge production and knowledge integration. According to them, the emerged outcomes of these processes which include tested, evaluated, surviving beliefs, sharable ideas and linguistic formulations help adaptive systems and their agents to adapt to the changing environment. Similarly, the advocates of complexity theory see organizations as a complex whole where multiple interactions between constituent components and agents give rise to emergent changes and spontaneous self-organizing outcomes [Smith and Graetz 2006; Brodbeck 2002]. The basic premise of complexity theory here is that there is a hidden order to the behavior (and evolution) of complex systems, whether that system is a national economy, an ecosystem, an organization, a production line, or institution of higher learning [Sherman and Schultz 1998]. Complex theory is used in organizations as a way to encourage innovative thinking and real-time responses to change by allowing organization units to self-organize.

Complex adaptive systems such as institutions of higher learning are capable of learning new knowledge and solving problems in sincerity and through a distributed knowledge-process environment in which there are equal opportunity and autonomy for participants interaction without reprisal, and although many available technologies for learning are identified as not fit for cognitive mapping especially higher level learning [Chen et al. 2003], it is not clear how learning organizations adopt KM to achieve emergent changes and what roles technologies play in this. Clearly, there still exist epistemic gaps on how to integrate users' organizational learning and managers' organizational learning [Mets and Torokoff 2007]; how to attain performance improvement in unpredictable circumstances through organizational learning and KM support technologies [Tomblin and Bennet 2006]; how to capture, share and manage members' knowledge through available KM technologies [Chen et al. 2003]; and how to achieve transformative growth of dynamically networked organizations such as higher institutions of learning [van Eijnatten and Putnik 2004].

Aligning higher education strategy, KM technologies and organizational processes for performance improvement is currently one of the key challenges facing higher education institutions. Malhotra [2004b] points out that management and coordination of diverse technology architectures, data architectures, and systems architectures poses obvious KM challenges. These challenges result from the need for integrating diverse technologies, computer programs and data sources across internal business processes and are compounded by the concurrent need for simultaneously adapting enterprise architectures to keep up with changes in the external environment. For this to happen, changes in the existing technologies or their replacement with newer technologies must be undertaken.

The effective introduction of KM technologies in higher education processes requires addressing key organizational issues placed at strategy, people, processes and enablers level [Margherita and Petti 2010]. This is because as organizations attempt to deal with important changes, a set of critical success factors need to be present such as the need for a comprehensive action plan and clear understanding of aspirations and goals of people involved and affected [Chruciel and Field 2006]. In fact, it is important to consider the integrative influence of content, context, processes, and individual differences on organizational change efforts as the organization's prior history has the potential to negatively influence success [Walker et al. 2007]. The introduction of KM technologies are often based on the introduction of new practices or systems but lack a holistic perspective which includes ICT and strategy alignment, management of change, inter-organizational communications, corporate innovation and business processes change [Galliers and Baets 1998]. The appropriation of KM technologies such as ICT can be considered as a socio-technical process and only an interplay approach can reveal the complexity of the interrelations between technology, work practices and organizations which are being modified [Hussenot 2008].

The implementation of KM technologies in higher education processes has typically been systematic rather than being systemic resulting into disjointed and uncoordinated efforts to achieve improvement in performance. For example, despite the prediction that instructional designers will play an important role in KM initiatives [Rosset and Donello 1999], training and development professionals as well as KM and learning technologies are seldom mentioned in KM systems literatures [Davenport and Prusak 1997; KPMG Consulting 2000]. These uncoordinated efforts largely compromise the potentials of KM technologies resulting into many of these KM projects failing to deliver on what they promise [Ambrosio 2000], mainly due to the failure to connect KM technologies to the daily work activities of knowledge users in higher education [KPMG Consulting 2000]. Increasingly, KM and higher education practitioners and researchers are beginning to realize the potential and importance of the synergies between KM technologies and higher education processes in contributing to performance improvement. Davenport [1993] and Nissen [1998] for example, point out that new information technology needs to be integrated with the design of the processes it supports, which includes consideration of the organization, people, procedures, cultures and other key factors, in addition to technology.

According to Montano and Dillon [2005], while much research has been made to examine how technology impacts individuals, groups and organizations in their entirety, not much attention has been directed

at how technology impacts on the relationships between KM and higher education processes and how they can be integrated. The role of ICT professionals has been investigated as positioned to broker organizational knowledge [Pawlowski and Robey 2004] whereas the ICT user is positioned as a social actor, which assumes complex and multiple roles while adopting, adapting and using information/knowledge systems [Lamb and Kling 2003]. Other relevant research works associated with firm-level knowledge integration includes the inseparability of people in the processes of knowledge integration [Nahapiet and Ghosal 1998; Leonard-Barton 1995]; technology's role and limitations [Stokes and Clegg 2002; Argote and Ingram 2000]; and the impact of firm organization on integration capacity [Kogut and Zander 2001; Nonaka and Takeuchi 1995]. Leonardi [2007] for example points out that the relationship between technology appropriation and the organization's informal advice networks is useful in understanding how information and knowledge created, modified, transmitted, and stored through the use of ICT can lead to organizational change. And although such integration of KM technologies with higher education processes is promising, they are still sporadic and lack an explicit theoretical basis for connecting them to ensure improve performance in higher education.

To take full advantage of the potential of KM technologies in improving performances in higher education, appropriate theoretical approach for integration must be developed based on the synergies that link KM technologies, higher education processes and performance improvement endeavors. This paper uses the ideas and concepts from processes reengineering in higher education, task technology fit theory and an integrative learning and performance architecture to propose a theoretical approach for integrating KM technologies in higher education processes with a view to achieving improved service deliveries and sustained competitive advantages. First, we begin by giving an overview on the theoretical concepts of processes reengineering in higher education, task/technology fit theory and integrative learning and performance architecture. This is followed by the examination of the justification for integration, and the integration dimensions and intersections between knowledge, performance and learning technologies. We then make proposal on a new approach for the integration of KM technologies in higher education processes, highlight the implications of the proposed approach in practice, and then make conclusion on further directions of the study.

2. PROCESS REENGINEERING IN HIGHER EDUCATION

Hammer and Champy [1993] define process reengineering as the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical temporary measures of performance such as cost, service, quality and speed. In higher education, Penrod and Dolence [1992] define process reengineering as using the power of modern information technology to radically redesign business processes in order to achieve dramatic improvements in organizational performance. To achieve goals, all institutions, whether public or private that aim at striving in a knowledge driven world must, of necessity, be organizations that are constantly learning and changing, that maximize the use of knowledge and information, and deploy it faster and to better advantage than their competitors. It is only through successfully tapping the powerful synergy resulting from the merger of technology and business strategy to transform their organizations through radical processes redesign driven mainly by the new technological possibilities and new learning environment, that higher education institutions will experience an unparalleled competitive advantage [Tsichritzis 1999].

In this paper, we use Martin [1995] model for process reengineering to guide our approach for integrating KM technologies in higher education processes. The model makes a proposition for process reengineering at four levels in organizations. In the first level, there is procedure redesign, where fundamentally new ways to do existing processes are required. Without such fundamental process redesign, there will be limited improvements in productivity. Procedure redesign may involve automation of activities, or improved dissemination of information and knowledge, but it does not necessarily require replacing current processes or organizational structure. In the second level referred to as process reinvention, radical changes in processes are sought to achieve significant breakthrough improvements in customer services. The focus here is on end-to-end set of activities that delivers particular result to a given customer, and customers needs drive the redesign of the processes, rather than customers being required to adjust to the needs of processes. Educational programs and researches are examples of primary processes and human resources and financial management are examples of support processes.

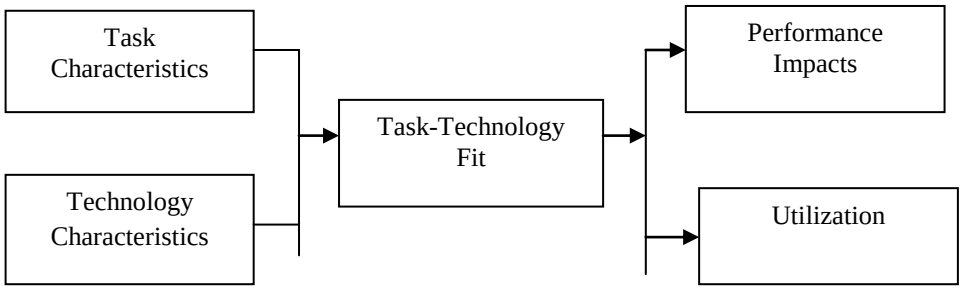
The third level referred to as enterprise redesign deals with a complete redesign which is characterized by high risk and high benefits including reduction of barriers to fast and fluid decisions. Implementing enterprise redesign strategy in organizations usually result into an overall reduction in cost of operation; increased speed and efficiency in performance; faster communication of information and knowledge; reduction of barriers to fast, fluid, flexible decisions and actions; increased responsiveness to customer needs; increased use of information-driven decision-making; and increased value from the organization's investment in human resources. Finally, in the strategic visioning level, organizations strategic assumptions and visions should be constantly revisited. No matter how powerful an organization's technology is or how effectively enterprise engineering strategies are employed, it will not succeed if it is headed in the wrong direction. King [1994] points out that the reason for the

failure of organizational transformation effort is high in organizations that view this transformation primarily as a technical rather than a strategic effort.

3. TASK-TECHNOLOGY FIT THEORY

Predicting and explaining how information technology affects human and organizational performance is a key task for knowledge and information systems researchers [Delone and McLean 1992; Seddon 1997]. Such research can improve understanding of the business processes value impacts of information technology [Davern and Kauffman 2000], and can yield managerial interventions and design prescriptions for more effective use of knowledge and information systems. The fit between the task requirements, user abilities and system characteristics has been shown to be a key predictor of individual performance with knowledge/information systems through the task-technology fit theory [Goodhue and Thompson 1995]. The theory holds that information technology is more likely to have positive impact on individual performance and be used if the capabilities of the information technology match the tasks that the users must perform and consist of three main components namely task, technology and individual characteristics.

Figure 1: Task-Technology Fit Theory [Goodhue and Thompson 1995]



Task: Is defined here as comprising three components: products, required acts, and information cues. Products are ends, while required acts and information cues are means for achieving the ends or goals. Behavioral requirements which refer to acts to be carried out and information cues to be used will vary according to the level of performance required in the task product. In practice, there may often be substantial choice amongst sets of required acts (more than one way to achieve the goals of the task) and the decomposition of these tasks into goals and acts can be carried out even further. User interactions with computer-based systems have often been described in terms of a hierarchy of tasks [Gerlach and Kuo 1991]. Rasmussen [1988] identifies three levels of abstraction for computer supported work tasks; functional purpose, generalized, and physical. In the same vein, Silver [1990] distinguished between mechanical and conceptual tasks in decision support system usage.

Technology: Following Wand and Weber [1990] proposition, a two-part view of information systems is employed here: technology-as-tool and technology-as-representation. Technology-as-tool provides the physical interface for manipulating the technology, while technology-as-representation implies a model of the real world task as opposed to a designer's system metaphor or mental model inside the head of the user. Distinguishing between technology as tool and as representation is useful in that it can help in organizing various literatures addressing behavior with information technology. For example, research on the psychology of decision models [Cooksey 1996; Melone et al. 1995] bears on technology as representation, whereas work in human-computer interaction [Davern 1997; Gerlach and Kuo 1991] bears on understanding technology as tool.

Individual characteristics: Newell [1982] provides a framework by which it is possible to understand individual behavior in terms of knowledge and goals through what he refers to as the principle of rationality. The principle states that if an agent has knowledge that one of its actions will lead to achieving one of its goals, then the agent will select that action [Newell 1982]. What this implies is that if individual users goals are known, then from observing their behaviors, their knowledge needs can be inferred. Alternatively, if the goals and knowledge of individual users are known, their behaviors can be predicted. Newell's [1982] framework complements the definition of task in terms of products, required acts and information cues as was earlier pointed out. To understand behavior and ultimately performance with information technology therefore requires understanding both the goals and knowledge of users.

4. INTEGRATIVE LEARNING AND PERFORMANCE ARCHITECTURE

Training and learning have significant roles to play in any successful higher education operation processes. Faced with the ongoing challenges of constant changes and an insatiable need for knowledge, higher education institutions have embraced technology-enabled KM and learning as a way to keep up pace with emerging challenges by strategically integrating learning and performance architecture that significantly expands the set of tools, approaches and strategies for KM and learning in a modern and complex organization [Rosenberg 2006; Yoon and Lim 2007]. An integrative learning and performance architecture is a systematic integration of approaches (electronic and non-electronic) that facilitates both formal and informal workplace learning and support and, ultimately, improved performance. The architecture describes a model of how these approaches relate to each other and is based on five important truths about learning and how learning technology must perform to fulfill the promise of a high-performing organization that allows knowledge and capabilities, enabled by technology, to grow and flow freely across departmental, geographical and hierarchical boundaries, where it is shared and made actionable for the use and benefit of all (smart enterprise) [Rosenberg 2006]. The five truths are:

- Most learning takes place on the job. Employees learn from the peers, the corporate intranet, trade publications, and trial and error. To assume that training is the only place where learning occurs is to severely limit your options and perspective that you will be hard-pressed to demonstrate any real and lasting value to the organization.
- Learning is not training. It transcends the classroom and is critical to the successful accomplishment of work. In other words, training is one of the many ways to facilitate learning, and learning is one of the many essential activities that support individual and organizational performance.
- Training is incapable on its own of supporting all the learning needs of employees, partners, employers and users. The need for new skills and knowledge and the need to build sustainable competence require a broader set of solutions than just instructional ones.
- Technology has demonstrated a powerful capability to enable workforce productivity, and it can do the same for learning. From personal computing to global networks and the web, technology has contributed mightily to productivity. But technology does not drive or create a learning and performance architecture (the smart enterprise); it supports them.
- Learning effectiveness (what people learn) is extremely important in the smart enterprise, but it does not, in and of itself, constitute the ultimate value proposition. Value proposition comes from the improved level of workforce performance (what people actually do), which contributes directly to business success.

Rosenberg [2006] views KM as the creation, archiving, and sharing of valued information, expertise, and insight within and across communities of people and organizations with similar interests and needs, the goal of which is to build competitive advantage. Yoon and Lim [2007] similarly point out that that strategic blending is practiced by purposefully integrating learning and performance solutions, which should be guided by the goals and needs of the organization. In both views, technologies are selectively and strategically implemented to best support the business-driven learning and performance solutions. With modern technologies' power and connection speed; seamless integration and alignment of business systems, information systems, human resources systems, and learning and performance systems in higher education into a KM system is possible.

5. JUSTIFICATION FOR INTEGRATION

KM technologies have been recognized as enabling tools in facilitating KM in higher education because they are capable of assisting knowledge seekers and experts engaged in different types of knowledge acquisition processes such as socialization, externalization, combination and internalization [Apostolou et al. 1999]. In the socialization processes where tacit knowledge is transformed to tacit knowledge, the KM technologies enable user interactions by assisting them to communicate with one another by making the organizational knowledge to be spread across the entire organization. Examples here include e-mails, discussion lists, bulletin boards, collaborative hypermedia, multimedia conferences and brainstorming applications. In the externalization processes where tacit knowledge is transformed to explicit knowledge, organizational memory or repository has a significant role in organizing and structuring knowledge to make it available to other individuals in the organization [Apostolou et al. 1999]. In the combination processes where explicit knowledge is transformed to tacit knowledge, decision supports systems and workflow applications are the typical supporting tools. Finally, in the internalization processes where explicit knowledge is transformed to tacit knowledge, the use of KM technologies such as data warehousing, data mining and computer-based training assist novices to re-experience what the experts have done in similar situations.

Levy [2004] describes several futuristic scenarios to illustrate how knowledge and information can be assembled by technologies to provide personalized performance support and learning opportunities to knowledge users and workers. Raybould [1995] developed a systemic definition of electronic performance support systems that incorporates KM processes and learning technologies components. Laffey [1995] proposes a dynamic performance support model that integrates organizational learning, performance support, and learning by doing. Unlike traditional electronic performance systems that support procedural tasks with an existing body of content and support, Laffey's [1995] model integrates knowledge capturing, community building, references, and training tools to handle ill-structured problem situations. Moreover, process reengineering in higher education, enabling technologies and KM processes can all serve as solutions to enhance performance in higher education through developing of appropriate approach for integration. The shift to performance improvement, KM, and the central role of learning in higher education has the potential to place training and instructional design and technologies' professionals in a strategic role in their organizations [Larson and Lockee 2004]. Improvements in higher education usually result from an increase in value generated for the key stakeholders of the institution and the institution's ability to manage its business processes. The effectiveness and efficiency of performing higher education are thus, based on processes that allow institutions to grow and develop organizational competencies through appropriate integration of KM technologies and higher education processes. This is because KM is at the heart of business performance improvement and value creation [Carlucci et al. 2004].

6. DIMENSIONS TO INTEGRATION

Available evidence from literatures indicate the existence of some critical dimensions that must be put in place to address the transformation of KM and organizational processes through adoption and use of appropriate enabling technologies to achieve improve performance. Grant [2002] for example, points out the appearance and consolidation of a new management perspective that includes a host of behavioral, technological, organizational and strategic theories and contributions. In basic terms, these KM perspectives identify a set of processes through which knowledge is acquired, developed, gathered, shared, applied and protected by the firm in order to improve their performance [Alavi and Leidner 2001]. The perspective points to the fact that KM is a key component in an organization's ability to realize the full potential of its intellectual assets in strategic and tactical decision making and in creating a competitive advantage [Rowley 2004; Bose 2004]. To ensure the success of KM, it is crucial that KM enabling technologies are integrated in higher education processes so as to enable it to effectively utilize higher education institutions' resources, reduce the use of manpower, material, and time, and still be able to achieve improved output and expected results [Yeh et al. 2006].

Hansen et al. [1999], Ruggles [1998] and Robertson and O'Malley [2000] found in their study that good human resource practices and culture that fulfill employees' expectation in appraisal, reward systems and satisfying work can influence employees' decision in knowledge sharing. Besides that, employees' perceptions on the threat of knowledge sharing in terms of undermining status, expertise and losing advantage also influences them on knowledge sharing [Morris 2001; Willman et al. 2001]. According to Swan et al. [1999] and Smith [2001], one of the important factors that shape knowledge sharing is organizational culture. If the organization has a culture that encourages knowledge sharing with attractive reward system, then it will promote knowledge sharing for its employees. With respect to KM strategies development, Earl [2001] and Garavelli et al. [2004], include "knowledge culture" as an essential factor which makes implementation easier, along with other elements such as leadership, human resources practices or the organizational structure.

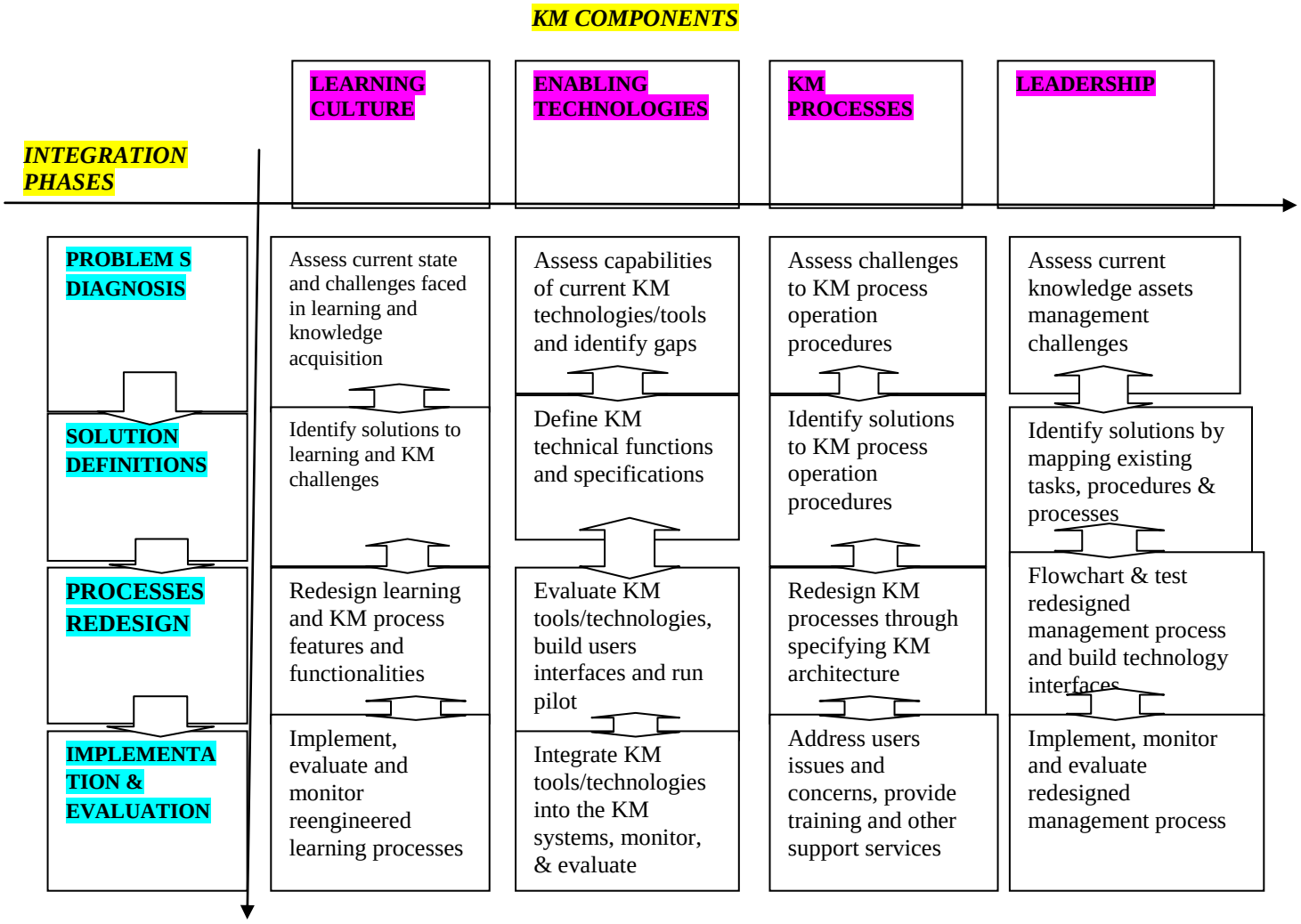
In higher education which is associated with learning organization, Ortenbald [2004] proposes an integrated dimension to KM model that includes organizational learning, learning on-the job, a climate of learning and an organizational structure that is flexible and organic. Learning organization here refers to organizations that are skilled at creating, acquiring and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights [Garvin 1993]. Sarawanawong et al. [2009] propose a hybrid KM framework development strategy in higher education in which a personalization strategy/human oriented style (or people-to-people) plays a leading role and codification (or people-to-document) plays the supporting roles. The personalization strategy includes knowledge identification, knowledge creation and knowledge acquisition using appropriate ICT enabling tools; while the codification strategy includes knowledge storage, knowledge organization, knowledge distribution, and knowledge application. Abdullah et al. [2005] propose a KM system framework in a collaborative environment for higher education that is composed of five components. These include functionality and system architectures aspect as the backbone to support the KM system; psychological aspects, cultural aspects, and the knowledge strategies and measurements or system auditing aspects. Finally, Chen and Burstein [2006] proposes a dynamic model of KM for higher education based on the argument that it is a combination of technology with appropriate policies and people skills using the technology infrastructure that leads to successful KM framework development and implementation. The model puts emphasis on the fact that KM framework is more than just the advantage of technology, intranet and internet, but must includes

organizational issues, information resource management, together with cultural changes if a KM implementation processes is to succeed.

7. INTEGRATION APPROACH

Using the reviews and ideas from the background concepts and other relevant literatures, we identify and develop the integration approach using a matrix of activities bounded by four KM dimensions/components and four steps to an overall integration processes resulting into sixteen KM development activities as shown in figure 2 below. Each of the KM components and the integration phases are essential because they ensure that the integration will solve the right problem, using the appropriate enabling technologies/tools, and creating the right environments for learning and improved performances in higher education.

Figure 2: Proposed Integration Approach



7.1 KM Components

7.1.1 Learning culture: To become a learning organization is to accept a set of attitudes, values and practices that support the processes of continuous learning within the organization. Training is a key element in the business strategy of an organization dedicated to continuous learning. Through learning, individuals can re-interpret their world and their relationship to it. A true learning culture continuously challenges its own methods and ways of doing things. This ensures continuous improvement and the capacity to change. Senge [1990] has identified five disciplines of a learning culture that contribute to building a robust learning organization and these include:

(i) *Personal mastery* – This involves creating an environment that encourages personal and organizational goals to be developed and realized in partnership.
(ii) *Mental models* – Helps one to know that a person's 'internal' picture of their environment will shape their decisions and behavior.
(iii) *Shared vision* – Helps in building a sense of group commitment by developing shared images of the future.
(iv) *Team learning* – Helps in transforming conversational and collective thinking skills, so that a group's capacity to reliably develop intelligence and ability is greater than the sum of its individual member's talents.
(v) *System thinking* – Helps in developing the ability to see the 'bigger picture' within an organization and understand how changes in one area affect the whole system.

7.1.2 Enabling Technologies: Enabling technologies refer to the fundamental building block of ICT that support and coordinates KM in higher education and may include databases, knowledge platform, and integrated performance support systems [Beckman 1999]. Yeh et al. [2006] point out that enabling technologies and KM are closely tied together because both help in the propagation of structured knowledge vertically and horizontally within organization, and make searching and using knowledge much easier. Zack [1999] believes that ICT plays four different roles in KM including obtaining knowledge; defining, storing; categorizing, indexing, and linking knowledge-related digital items; seeking and identifying related contents; and flexibly expressing the content of knowledge resources based on the various utilization background. To succeed in KM, there is need to select the right KM tools and technologies. From search to document management to collaboration, there is an increasing array of sophisticated tools and technology applications that make a KM systems work. The choice of enabling technologies as proposed in our approach should enable search of information and knowledge; have a platform to support a systematic, coordinated approach to the distribution, sharing, archiving and updating of knowledge; be able to identify experts and provide access to them; and provide periodic evaluation of existing content.

7.1.3 KM Processes: KM processes refer to the concept of taking data and turning it into useful and applicable knowledge in a higher education environment and includes such processes as data capture, data storage, data organization, data analysis, and knowledge sharing. The entire point of gathering data, storing it, organizing, analyzing and sharing it is so that the institution can use vital higher education information/knowledge to see what needs to be done, what needs to be improved, what can be eliminated, what needs to be maximized and what's possible in the future. Shukor et al. [2009] define KM processes as a systematic approach to the identification, capturing, organization and dissemination of the intellectual assets that are critical to the organization's long term performance. KM processes help in turning an organization's intellectual property (recorded or expert of its members) into a greater productivity, new values and increased competitiveness. To create a comprehensive approach to integrating KM technologies in higher education processes, an organization has to provide for the whole knowledge lifecycle. To achieve this, our approach suggests identifying key KM processes with the ultimate stress and goal on optimization of knowledge use. The processes identified should be able to coexist and act simultaneously within a KM framework system contributing to KM effectiveness and efficiencies.

7.1.4 Leadership: Leadership in the integration of KM technologies with higher education processes involves implementing changes that may not easily gain acceptance in organizations unless the leadership mobilizes the support of all stakeholders to provide a conducive environment for widespread sharing of knowledge. Leadership roles in KM include overcoming resistance to change; and dismantling barriers to communication, both across the organization and between different levels of management, and nourish the culture and climate for KM through building of executive support and championing of KM. The introduction of KM in higher education can also be considered as a type of organizational change, and therefore, the level of support by the top management will determine its success or failure [Liebowitz 1999]. The commitments of the top management in KM usually determine the amount of resources allocated, and the amount of time that is allowed for members to conduct the creation and sharing of knowledge [Von Krogh 1998]. Davenport et al. [1998] highlights three crucial areas in KM where leadership can play important roles and these include conveying the information that KM and organizational learning are the keys to the success of an organization, providing financial and other resources to build the fundamental blocks of KM, and clarifying the kind of knowledge that is important to the organization.

7.2 Integration Phases

7.2.1 Problems Diagnosis: This phase aims at understanding the current state, rationale, and objectives of learning, enabling technologies, KM processes and leadership in higher education with the view towards identification of challenges faced. These involve assessing the organization's strength and weaknesses in these

areas, as well as opportunities and risks associated with solving the problems, and requires active participation from all stakeholders in documenting and understanding the environmental dynamics and associated risks. It is important in this phase to identify both the positives and negative aspects of the current state from how the organization creates, archives, and distributes information and knowledge to how people collaborate and how experts are used [Rosenberg 2006].

7.2.2 Solutions Identification: This phase involves identification of solutions to learning objectives, technology gaps, key KM processes and leadership challenges with a view to articulating solution specifications and requirements to address challenges faced. Using the documentation obtained during the diagnosis of the problems, the outcome of the solution identification phase is then used to flowchart the integration processes. This is not only critical to mapping the core tasks and procedures of the integration processes, but is also foundational for reengineering higher education processes.

7.2.3 Processes Redesign: This involves designing and configuring of the technological features and functionalities of the learning processes, management environment and KM processes such as the search engines, content management, content publishing procedures, and rules for protecting proprietary information and knowledge. As the learning and KM processes is redesigned in this phase, the flowchart of existing processes identified in phase two above is updated to include clarification of the key measurement variables. The use of information technology as enabling and facilitating tools is a key feature for process reengineering in this phase.

7.2.4 Implementation and Evaluation: The final phase is intended as a first step to prototype the redesigned processes in higher education so as to address users' and stakeholders' issues and concerns. This is followed by implementations and monitoring of initiated changes to ensure successful operation. In addition, leadership must ensure that the implementation is accompanied by a training and support strategy that extends far beyond the initial rollout period. Since KM may represent a new way of learning and supporting performance in higher education, as well as a new emphasis on user-initiated and user-defined knowledge access and utilization, particular attention is required in ensuring continuous management of change in the organization.

8. IMPLICATIONS FOR PRACTICE

The emerging insights arising from this paper extend our understanding of the relationship between organizational learning, enabling technologies, KM processes and leadership in order to achieve performance improvement in higher education. Knowledge can be considered as the processes of knowing and an object that can be manipulated, and as the assets and capabilities that higher education institutions must align with their education processes to gain competitive edge [Martin and Deng 2003]. KM is essential for organizations to leverage their knowledge in a dynamic life cycle in which the role of enabling technologies are to enable and facilitate KM efforts [Alavi & Leidner 2001; Prusak 2006]. Enabling technologies need to support and integrate with learning culture, KM processes and management and governance of higher education institutions if improved outcomes are to be achieved. KM strategy and processes should be aligned with higher education processes [Prat 2006]; and organization management, structure, and culture must be knowledge-friendly for developing the capabilities that an organization needs to achieve its goals.

Technology serves as a key enabler of a performing enterprise, acts as a bridge between individual and organizational learning in higher education, and is essential to building and sustaining learning in today's large and complex organizations. It improves the quality and expands the reach of learning products and approaches of all kinds, enables these resources to work in harmony, creating a far more valuable solution, and can provide a single, personalized gateway to a wide array of instructional and informational resources for each individual while maintaining a singular organizational perspective [Rosenberg 2006]. By embedding the most critical dimensions to KM in higher education, the proposed approach can be used as an aggregation framework to support a more holistic design of organizational processes by overcoming limitations such as poor attention to individual perceptions, unfocused processes redesign opportunities, non-systematic exploration of alternatives and preliminary assessment of performance impact. In particular, the approach represent a tool for higher education managers, policy makers and all relevant stakeholders who would wish to systematize a set of interventions to increase the efficiency and effectiveness of higher education processes through developing a cross-disciplinary and multi-perspective strategy for performance improvement and positive change; evaluating the most suitable organizational context and people dimension of change; and identifying a mix of technological and organizational enablers to streamline the adoption of new models for organizational change.

Current developments in the higher education sector represent users and employees alike with an ever changing organizational landscape dominated with new emerging technologies. In addition, the recent trends towards global competition, knowledge economy, shortened product life-cycles, internationalization, and mass

customization of education are forcing higher education institutions to implement flexible arrangements, such as network structures and virtual teams, and require that new employees and students are able to contribute immediately in enhancing performances. They need to be able to seek needed information and use the potential of emerging information technology to exploit available knowledge base. It is in this respect that our approach attempts to make explicit the mutual dependencies between organizational learning, enabling technologies, KM processes and leadership in higher education processes, and their integration in order to allow for the optimization of employees' and students' learning plans with respect to higher education processes taking into account competencies, skills, performances and knowledge available within the organization. This mutual dependency, bridging individual and organizational learning enables an improvement loop to become a key aspect for successful higher education processes improvement and reengineering, enabling a closure, at the same time, of the learning and knowledge loops at the individual, group and organization level. As Trondsen [2004] points out, enterprise learning should closely connect and align with work tasks specific to job roles and should relate to institutional objectives, processes and workflows. This will lead to an improved productivity and higher education outcome; an improved relevance and use of learning technologies, content, and resources; and a greater focus on learner and work context; leading to improved performances and satisfaction.

9. CONCLUSION AND FURTHER DIRECTIONS

The main objective of this paper was to propose an approach for integrating KM technologies in higher education processes with a view to achieving enhanced performances. The development of the approach uses the background concepts from processes reengineering in higher education, task technology fit theory and integrative learning and performance architecture to identify a matrix of activities bounded by four steps to an overall integration processes and four KM components resulting into sixteen KM development activities. Each of the integration phase and KM component is essential because they ensure that the integration will solve the right problem, using the appropriate enabling technologies/tools, and creating the right environments for learning and improved performances in higher education. We believe that the proposed approach described, through the enabling effects of the World Wide Web and Internet technologies, can be successfully implemented because it provides tangible rewards for all the key stakeholders in higher education. This is because, the current repertoire of enabling technologies, tools and techniques, if harnessed appropriately, has much to offer for the design, development and integration of KM systems in higher education.

The implementation of change in organization based on the introduction of enabling technologies and process redesign is affected by many factors at organizational learning, KM processes and leadership levels. This paper addresses the centrality of aspects related to the "why" (objective and focus), "where/what" (organization and business area/processes level), and "how" (models and enablers) of change, and integrates them into a single framework to support a more comprehensive and effective design. In addition, the article provides additional support for the idea of integrative learning and KM architecture, as put forward by Rosenberg [2006], where he argues that if learning is conceptualized as situated knowing and the creation of knowledge through participation in practice, then creating and maintaining two separate systems, one for learning management and another for KM does not make much sense. Our proposed approach thus helps to clarify the connection between organizational learning, enabling technologies, KM processes and leadership, demonstrating that the traditional focus of higher education processes focusing on designing and implementing learning and educational development solutions need to be expanded to embrace the design of integrative KM and learning systems that incorporates appropriate enabling technologies.

The approach proposed in this article aims at supporting the pre-implementation phase of change in higher education and therefore requires empirical assessment and validation through practical implementation. In addition, the paper offers several other logical extensions as future direction for further research. For example, determining the extent to which organizations engaged in KM using appropriate enabling technologies and their awareness of learning outcomes and needs would be an area for carrying out further enquiry. Furthermore, the deployment of technologies such as the intranets, extranets, or groupware, cannot of itself deliver improved performance in higher education, and further research is needed to determine how these technologies should be adopted and appropriated by the human users, on how they can be integrated within their respective work-contexts, and how they can be effectively utilized while being driven by the performance outcomes of the enterprise. Finally, the main intention between the use and integration of KM technologies in teaching and learning is often to change how teaching, learning and research are conducted in the sense of putting more emphasis on interactions, flexibility and innovation [Stensaker et al. 2007]. This can only be achieved through determining the linkages between goals, people and pedagogy in higher education because the missing or insufficient links between KM technologies and learning process initiatives, as well as the lack of internal promotion activities aimed at spreading the gospel on how KM technologies can enhance higher education processes, are at present a hindrance to better integration and use of KM technologies in higher education.

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