

A Framework for Teaching Knowledge Management as a College Course

Meenu Singh

Department of Computer Science and Information Systems

College of Business

Murray State University

Murray, KY 42071

USA

Abstract

Knowledge management (KM) has come of age. In the knowledge-based economy, mastering KM skills places new college graduates in a stronger position to become valuable knowledge workers contributing effectively to their organization's well-being. Even though KM has been practiced with major successes in the real world for quite some time, the body of industry practice has not quite found its way into university courses. We present a structure that should facilitate the diffusion process to universities by making it easier for an instructor to make the intellectual commitment to teach KM. We believe that the Knowledge Chain (KC) Model, field tested with empirical evidence gathered from KM practitioners worldwide, can provide useful guidance in creating core KM teaching modules with numerous emphases. KM is such a powerful and vital topic that it won't be long before it moves across curricula encompassing numerous disciplines.

Keywords: Knowledge management, knowledge chain model, competitive advantage, core modules, curricula

1. Introduction

The economy of the 21st century is increasingly based on knowledge. Knowledge and its management is now recognized as the driver of productivity and economic growth, leading to a new focus on the role of knowledge, technology, and learning in economic performance. Although conceptually an ancient idea, knowledge management (KM) is a relatively new business philosophy. The goal of knowledge management is to identify, capture, store, maintain, and deliver useful knowledge in a meaningful form to anyone who needs it, any place and anytime, within an organization (Turban et al., 2011). KM has the vast potential to revolutionize the way we share expertise, make decisions, and conduct business. Knowledge is indeed a precious asset, and conscious and active management of which can bring significant contribution and benefits to the organization. In the knowledge-based economy, value flows from the technology and practices used to harness an organization's knowledge resources and knowledge-processing skills. Effectively managing knowledge has emerged as a critical source of competitive advantage (Turban et al., 2011). Researchers in the field of sustainable competitive advantage assert that knowledge, which includes what the organizations knows, how it uses what it knows, and how fast it can know something new, is the only factor that offers an organization a competitive edge (Prusak, 1996). Knowledge and its management are more valuable and more powerful than natural resources, big factories, or fat bankrolls (O'Dell and Hubert, 2011).

Many empirical studies such as conducted by Delphi, Hughes Space and Communications Company, and Ford Motor Company support the assertion about competitiveness through KM. Ernst and Young Center for Business Innovation conducted a survey of 431 US and European organizations and reported "that more active management of knowledge is possible and advisable - indeed, that it is critical if a firm is to gain and sustain a competitive advantage" (Holsapple et al., 2007). In the same study, 875 of the respondents describe their businesses as knowledge-intensive, indicating knowledge and its management is critical to their competitiveness. User success stories via KM are reported in KM journals such as Knowledge Management Research and Practice and Journal of Knowledge Management. In one survey conducted by the latter journal, over 90% of respondents perceived their organizations to be knowledge intensive (Holsapple & Singh, 2003). However, only 6% admitted that their organizations do enough to leverage knowledge very effectively to yield better performance. On the other end of the spectrum, unmanaged organizational knowledge led to failures such as those concerned with risk management at Barings Bank, Kidder Peabody, and Metallgesellschaft and insufficient knowledge management activity was a contributing factor to the 9/11 disaster (Simon & Gilgoff, 2003).

Since knowledge has become the core enabling asset, maximum leverage of intellectual capital is imperative. Many organizations have felt the need to better utilize its intellectual assets and started to develop KM systems and foster a knowledge management culture. Hundreds of companies around the world are committed to KM principles and processes, including many of the Fortune 500 firms (O'Dell & Hubert, 2011). KM is certainly becoming part of corporate culture, diffused throughout organizations in the same fashion as safety consciousness. Holsapple et al. (2007) noted that there has been a phenomenal growth in interest and activity in KM, as seen in many new publications, conferences, IT products, and job advertisements. They further pointed out that KM does not seem to have had much impact on the higher education sector so far, but there is some evidence of involvement.

We can compare the rapid proliferation of KM practice worldwide over the past decade to other industry practices such as Computer-Assisted Systems Engineering (CASE), Business Process Reengineering (BPE), Enterprise Resource Planning (ERP), and other IT inventions. Unfortunately, the formal teaching process at colleges and universities generally lag many years behind the active usage and leveraging of these practices in the real world. Universities are sometimes accused of being responsible for an unnecessary delay in bringing new organizational practices to students. The dissemination of knowledge management concepts and practice is no exception and seems to be following the same course. In one survey of 25 MBA programs in the U.S., based on U.S. News and World Report's ranking, less than one quarter of these institutions (4 of 25) had a functioning KM course, although many (13 of 25) had KM content in existing courses (Ruth et al., 2003). KM coverage generally has been limited to survey classes dealing with broader information technology or management practices. Recently, a few universities have begun to offer more focused KM curricula and, in some cases, degrees at the graduate level have appeared that address components of the KM setting such as infrastructure, relationships, knowledge creation, knowledge codification, knowledge storage and retrieval, and the valuation of knowledge, among others (Ruth et al., 2003).

Universities have been slower to recognize the importance of the KM approach for a number of reasons. First of all, it is not evident which disciplinary area or specialty will most appropriately champion the KM diffusion process. Typically, KM is found in business and technology curricula. Second, aside from macro-level contentions by companies that KM is a basis for competitiveness and an assortment of success stories supportive of these contentions, there has been little investigation of the connections between KM and competitiveness. The knowledge management practice seems to be just like a black box whose internal workings are not clearly understood. Specifically, what KM activities can be contributors to competitiveness? An answer to this question would identify key activities that deserve careful attention in an organization's quest to leverage its knowledge into a competitive advantage. Each such activity can be a focal point for improvements that match or surpass competitors' executions of the same activity (Holsapple & Singh, 2003). Third, Davenport and Cronin (2000) suggested that KM is a complex and multidimensional concept that requires diverse insights. Therefore, a partial understanding of KM may result in an overemphasis on different aspects of knowledge management, resulting in an imbalanced approach. This implication also did not help facilitate diffusion of KM into the academy.

A key to understand KM and fully exploit its competitive potential is a model that identifies value-adding KM activities. Each can be a candidate for enhancements that add value to an organization. Practitioners could use the model to structure their consideration and evaluation of KM initiatives. Researchers could use the model to structure their exploration of connections between KM and competitiveness. Educators could use it to structure coverage of KM activities and impacts in their courses. These motivations, coupled with the absence of such a model in the literature, led to the creation of the Knowledge Chain model by Holsapple and Singh (2003). This paper will mainly explore the nature of KM and its application to academia. We hope that the Knowledge Chain model will facilitate the university's traditional role as an agent for diffusing KM's sound principles to a broader audience, and it should aid teachers in several disciplines in planning and delivering KM courses.

2. Background

Knowledge management aims to ensure that the right knowledge is available in the right representation to the right processors (human or machines) at the right time for the right cost (Turban et al., 2011). To achieve this objective, KM activities are undertaken that involves a landscape of knowledge flows and processing within a knowledge-based organization. In many cases, the manipulation activities and the flows that connect them can be performed, enabled, or facilitated with computer support.

We contend that one key to more fully exploit the competitive potential of knowledge management is to develop a model that identifies key value-adding KM activities (Holsapple & Singh 2003). We advanced one such model called the Knowledge Chain model that identifies and characterizes KM activities an organization can focus on to achieve competitiveness. The Knowledge Chain (KC) model is based on a KM ontology developed via a Delphi-study involving an international panel of prominent KM practitioners and academicians (Joshi, 1998). The model is analogous to Porter's value chain. It is comprised of five primary activities that an organization's knowledge processors perform in manipulating knowledge resources, plus four secondary activities that support and guide their performances. Table 1 and Table 2 provide a summary of the primary and secondary activities.

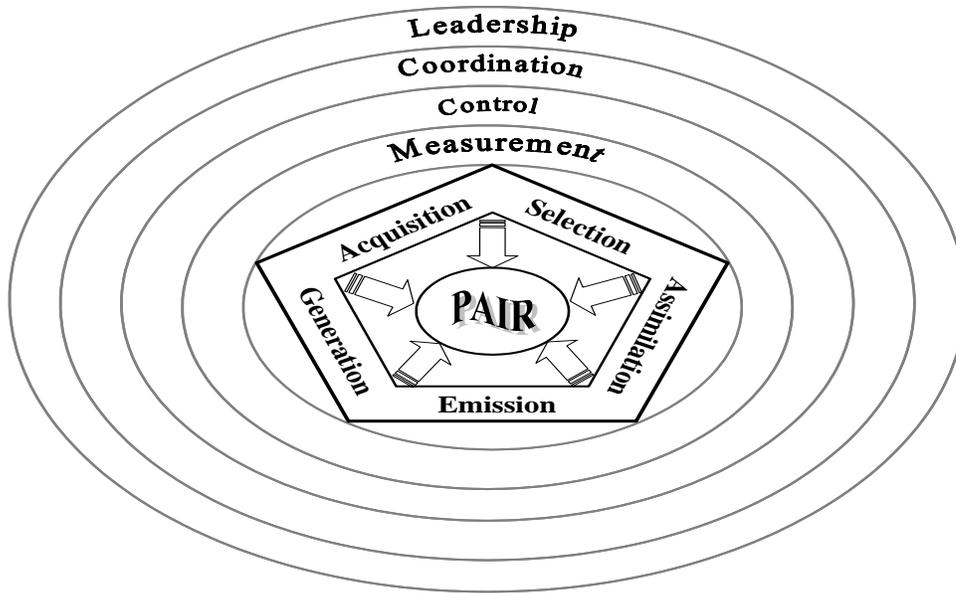
Table 1: Primary Activities Classes in the Knowledge Chain Model

Knowledge Acquisition	Acquiring knowledge from external sources and making it suitable for subsequent use.
Knowledge Selection	Selecting needed knowledge from internal sources and making it suitable for subsequent use.
Knowledge Generation	Producing knowledge by either discovery or derivation from existing knowledge.
Knowledge Assimilation	Altering the state of an organization's knowledge resources by distributing and storing acquired, selected, or generated knowledge.
Knowledge Emission	Embedding knowledge into organizational outputs for release into the environment.

Table 2: Secondary Activities Classes in the Knowledge Chain Model

Knowledge Leadership	Establishing conditions that enable and facilitate fruitful conduct of KM.
Knowledge Coordination	Managing dependencies among KM activities to ensure that proper processes and resources are brought to bear adequately at appropriate times.
Knowledge Control	Ensuring that needed knowledge processors and resources are available in sufficient quality and quantity, subject to security requirements.
Knowledge Measurement	Assessing values of knowledge resources, knowledge processors, and their deployment.

Competitiveness due to KM practices can manifest itself in such ways as increasing profits and bolstering an organization's reputation, employee's creativity, productivity, efficiency, flexibility, and innovation. Analysis of the extensive anecdotal evidence from the KM literature has revealed that KC activities can yield four important approaches to high performance: productivity, agility, innovation, and reputation (Holsapple & Singh, 2003). Accordingly, as illustrated in Figure 1, the KC model claims that various combinations and implementations of primary and secondary activities lead to four organizational performance implications: performance, agility, innovation, and reputation. Referred to as the PAIR approaches to competitiveness, the competitive role of each KM activity in the Knowledge Chain is examined in terms of one or more of these PAIR approaches.

Figure 1: The Knowledge Chain Model

Productivity is the rate at which goods and services are produced per unit cost. Although it is commonly defined in terms of labor, it can also be seen as the value people contribute to business. Due to the increasing dynamism of the global market, the competitive advantage provided by *agility* has emerged as an important priority. *Innovation* is the means whereby organizations exploit change as an opportunity for a different business or a different service, and it is capable of being learned and practiced (Drucker, 1993). The innovation process can be defined as bringing ideas to market. Now and in the future, more than at any time in history, the secret to competitive advantage is innovation (O'Dell & Hubert, 2011). Jeffrey Brown from Opinion Research Corporations states that: "Think of your *reputation* as a reservoir of goodwill. You can only go to the well so often before it dries up. Protect your reputation whenever you can" (Garone, 1998). Reputation derives from the interpretation by a public of a particular set of knowledge cues emanating from an organization; thus, an organization's conduct of KM activity impacts its reputation.

Anecdotal evidence can be a very useful part of the methodology by which we come to understand new and uncharted fields like KM. Although such evidence can be a strong indication of KM initiatives undertaken for the purpose of achieving better organizational performance, it can be complemented usefully by a survey that studies perceptions of KM leaders toward the connection between KM activity and organizational performance. Accordingly, we conducted a study to ascertain answers to the following questions with regard to each of the nine KC activities. Does the activity contribute to a competitive advantage by:

- a. Improving productivity (e.g., lower cost, greater speed)?
- b. Enhancing reputation (e.g., better quality, dependability, brand differentiation)?
- c. Enhancing organizational agility (e.g., more alertness, rapid response ability, greater flexibility and adaptability)?
- d. Fostering innovation (e.g., inventing new products, services, processes)?

The empirical evidence from leaders in KM initiatives confirms the existence and inclusion of each of the nine activities in the KC model. Thus, it confirms earlier anecdotal findings. In a very practical sense, this study tells us that each of the nine KC activities is linked to organizational competitiveness. Each can be conceived and implemented in ways that strongly contribute to an organization's competitiveness in terms of PAIR approaches. Each deserves consideration in planning an organization's competitiveness. (The details about the empirical study can be found in Holsapple and Singh, 2005).

3. Is Knowledge Management Suitable As a College Course?

Several aspects of KM would appear to make it a more interesting course in a graduate school setting for both professors and students than some of the other IT courses such as Expert Systems, Decision Support Systems, BPE or CASE. Ruth et al. (1999) provides three major reasons to support this contention.

First of all, KM is mostly about management, not about hardware or software. In fact, two of the best known champions for promoting KM are not the chief information officers or chief knowledge officers, but Mr. John Brown, CEO of British Petroleum, and Mr. James Wolfensohn, President of The World Bank. Currently, the KM success stories at BP and The World Bank are two of the most famous case studies used for teaching. Moreover, the leading figures in cases and lessons can be inherently more colorful and interesting. Larry Prusak, founder and executive director of the Institute for Knowledge Management, says that "Although technology surely has its place, working with knowledge is primarily a human activity needing human organization and understanding" (O'Dell and Hubert, 2011).

Secondly, unlike many of the Management Information Systems (MIS) texts, which primarily celebrate success stories, the case and stories of KM implementation show examples of both success and failures. In addition to the numerous user success stories via knowledge management in the literature, there isn't a shortage of instances in which unmanaged organizational knowledge led to failures such as those at Barings Bank, Kidder Peabody, and Metallgesellschaft. The failures of Sears and Kmart to extract crucial product knowledge for competitive advantage in the early 1990's are frequently discussed in the KM literature and contrasted with Walmart's successes. Inherently, contrasts of this sort are more interesting for students than a steady diet of success stories. A third advantage of KM as a teaching subject mentioned is that the field of KM can be presented from many different perspectives or points of emphasis. Depending on the setting or context, a course could emphasize an historical framework and migrate across the disciplines of philosophy and economics to a point where some of the basic KM concepts become the natural results of a system of thought that has spanned over two millennia. Other approaches could be developed as well, such as human factors, personnel emphasis, software emphasis, or industry emphasis.

Knowledge management has come of age, and it is now time to reap the benefits (O'Dell and Hubert, 2011). Organizations that figured out how to secure meaningful value derived from KM activities are thrilled with their results and can't imagine working any other way. KM is also evolving from an inward-looking focus on enterprise effectiveness to an outward-looking one where opportunities are sought to commercialize an organization's knowledge assets (Skyrme, 2003). The Internet has become an important medium for marketing and delivering knowledge, and the opportunities to commercialize knowledge are immense. The knowledge-based economy is a reality. Employment in the knowledge-based economy is characterized by increasing demand for more highly-skilled knowledge workers. Knowledge workers are concerned with procuring, storing, organizing, maintaining, creating, analyzing, presenting, distributing, and applying knowledge (Holsapple and Whinston, 1996).

In the knowledge-based economy, we contend that mastering KM skills places new college graduates in a stronger position to become valuable knowledge workers and effectively contribute to their organization's well-being. Moreover, the knowledge-intensive and high-technology parts of the economy tend to be the most dynamic in terms of output and employment growth. Unfortunately, universities have been slower to recognize the importance of the KM approach, and the academic initiative to equip future knowledge workers with KM skills and competencies is lacking. KM coverage at colleges has been limited to survey classes dealing with broader information technology or management practices. Only a small number of universities offer KM courses today. With respect to business schools in particular, it has been predicted that if the pace of diffusion of industry practice to the academy does not quicken, companies will do all of the teaching in their own schools, with little assistance from universities. This has already taken place at such KM power houses like Motorola, Disney, General Electric, General Motors, etc. (Ruth et al, 2003).

On May 5-6, 2011, the Knowledge Management Education Forum (KMEF) brought together some 75 educators in the field of KM to the campus of George Washington University in Washington, DC, to share their thoughts and seek consensus about the KM field. In their published goal, it was stated that "While there is a wealth of published and informal literature, thought derived from practice and dialog on these topics, a consensus on what constitutes the core elements of knowledge management competencies and knowledge management education is lacking." Many of those who currently teach KM feel that there is a case to be made for consensus among the people and organizations currently providing training, teaching knowledge management courses.

In the light of the above situation, the crucial questions for preparing a KM course are:

What is the intellectual territory that can be covered?

What courses can assist students in qualifying for jobs such as Knowledge Officer, Knowledge Leader, Knowledge Architect, and other jobs in organizations that have KM programs?

The empirical evidence obtained in our study suggests that each class of KM activities can be performed in ways that contribute to competitiveness. The model suggests that directors of KM initiatives need to be concerned with the Knowledge Chain's classes of activities, and with cultivating, harnessing, and organizing an organization's KM skills in performance of these activities. It also suggests that KM educators should not ignore any of these classes of KM activities in designing curricula. We feel that the Knowledge Chain model can provide useful guidance to educators to create core KM teaching modules with many approaches and emphases.

4. Core Modules in A Graduate Knowledge Management Course

In a recent study of educational institutions worldwide, it was found that out of the 37 knowledge management courses; only seven are at undergraduate level, while 30 are at the graduate level, designed as part of a master's program (Chaudhry and Higgins, 2001). Therefore, the dominance of KM at the graduate level prompted us to propose nine core modules that might comprise a KM graduate course, using the Knowledge Chain model as the basis. We recognize that no course will be able to encompass all of the modules. We understand that only some of the modules could and would receive major emphasis via two or three lectures.

4.1 Knowledge Acquisition Module

Recall from Table 1 that knowledge acquisition is defined as acquiring knowledge from external sources and making it suitable for subsequent use. This module will focus on the specific knowledge acquisition activities. A knowledge acquisition activity begins with identifying knowledge in the organization's external environment and concludes with transforming it into a representation that can be employed by the organization. A knowledge acquisition activity includes: Identifying appropriate knowledge from external sources by locating, accessing, valuing, and/or filtering; capturing the identified knowledge from external sources by extracting, collecting, and/or gathering knowledge deemed to be of sufficient reliability, relevance, and importance; organizing the captured knowledge by distilling, refining, orienting, interpreting, packaging, assembling, and/or transforming it into usable representations; transferring the organized knowledge to a processor(s) that immediately uses it or assimilates it within an organization for subsequent use; the activity receiving the transfer may or may not be performed by the same processor that did the acquisition. Each of these activities involves an active participation by the acquiring organization to specifically gain knowledge residing in the external environment.

4.2 Knowledge Selection Module

Recall from Table 1 that knowledge selection is defined as selecting needed knowledge from internal sources and making it suitable for subsequent use. Sub-activities in selecting knowledge include: Identifying appropriate knowledge within the organization's existing resources by locating, accessing, valuing, and/or filtering; capturing the identified knowledge from internal sources by extracting, collecting, and/or gathering knowledge deemed to be of sufficient reliability, relevance, and importance; organizing the captured knowledge by distilling, refining, orienting, interpreting, packaging, assembling, and/or transforming understandable representations; and transferring the organized knowledge to a processor(s) that immediately uses it or internalizes it within an organization for subsequent use; the activity receiving the transfer may or may not be performed by the same processor that did the selection.

4.3 Knowledge Generation Module

As noted in Table 1, knowledge generation is defined as producing knowledge by either discovery or derivation from existing knowledge. Sub-activities involved in generating knowledge include: Monitoring the organization's knowledge resources and the external environment by invoking selection and/or acquisition activities as needed; evaluating selected or acquired knowledge in terms of its usability for the generation task; producing knowledge from a base of existing knowledge by creating, synthesizing, analyzing, and constructing; transferring the produced knowledge for assimilation and/or emission; the activity receiving the transfer may or may not be performed by the same processor that did the generation.

4.4 Knowledge Assimilation Module

Recall from Table 1 that knowledge assimilation refers to the class of activities that alter the state of an organization's knowledge resources by internally distributing and storing acquired, selected, or generated knowledge.

Sub-activities include: Assessing knowledge to be internalized with requisite cleansing, refining, and filtering; targeting knowledge resources that are to be impacted by assimilation; structuring knowledge to be conveyed into representations appropriate for the targeted resources, including abstracting, indexing, sorting, labeling, categorizing, and integrating; delivering the knowledge representations to targeted knowledge resources. This distribution and sharing results in modification to these resources. Internalizing knowledge is a culminating activity in organizational learning.

4.5 Knowledge Emission Module

Recall that knowledge emission is defined as embedding knowledge into organizational outputs for release into the environment. It yields projections (i.e., embodiments of knowledge in outward forms) for external consumption, in contrast to assimilation which may also yield projections, but which is retained as knowledge resources. Emission is only partially a KM activity because it also can involve physical activities such as production through raw material transformation. Sub-activities involved include targeting the output. This is concerned with recognizing what needs to be produced for targeted elements of the environment; producing the output by applying, embodying, controlling, and leveraging existing knowledge to produce output for the target. This output is a representation of the knowledge used to produce it; transferring the output by packaging and delivering the projections that have been produced for targets in the environment. The process of effective projection adds value to an organization. The value can be added in various forms such as profits, image, customer loyalty, and visibility. Once emission occurs, its impact can be captured through the knowledge acquiring activity.

4.6 Knowledge Measurement Module

Recall from Table 2 that knowledge measurement is defined as assessing values of knowledge resources, knowledge processors, and their deployment. The valuation includes quantitative methods, qualitative assessment, performance review, and benchmarking. It is a basis for evaluation of the other secondary activities such as control, coordination, and leadership; for identifying and recognizing value-adding processors and resources; for assessing and comparing the execution of KM activities; and for evaluating the impacts of an organization's conduct of KM on bottom-line performance. Interestingly, this is an under-implemented area, but organizations that are able to create and use a set of measures that are tied to financial results to guide their knowledge management activities seem to come out ahead in the long run. The knowledge measurement activities can be grouped into two categories: Development of Measures (benchmarking, identifying key performance indicators, using different measures for different stakeholders etc.), and Applying Measures (performing a knowledge audit, measuring code reuse, identifying KM assets and their associated risks, estimating intellectual capital ROI, etc.)

4.7 Knowledge Control Module

Recall from Table 2 that knowledge control is defined as ensuring that needed knowledge processors and resources are available in sufficient quantity and quality, subject to security requirements. Quality is controlled with respect to two dimensions: knowledge validity (accuracy and consistency) and knowledge utility (relevance and importance). Controlling the quality of knowledge is a significant issue for KM because the value of knowledge and returns achieved from knowledge resources depend on its quality. This point is made evident in the recent New York Times fiasco (Simon and Gilgoff, 2003). This scandal has strongly affected the New York Times' reputational aspect of competitiveness. While the New York Times once set the standard for journalistic quality and reputation, readers are now questioning not only the articles that have been noted to have mistakes, but the quality of other knowledge emitted from this source. The New York Times management did not have the appropriate knowledge control activities in place in order to prevent this type of situation. Protection, another aspect of knowledge control, involves protection from loss, obsolescence, unauthorized exposure, unauthorized modification, and erroneous assimilation. Approaches include legal protection, social protection, and technological protection. Knowledge control activities can be grouped into KM Resource Control (using internal audits, managing cost of intellectual capital, realigning organization's structure and budget etc.) and Governance (ensuring legal protection of knowledge, identifying existing controls and security measures over the assets, improving defect analysis and customer service etc.).

4.8 Knowledge Coordination Module

As noted in Table 2, knowledge coordination is defined as managing dependencies among KM activities to ensure that proper processes and resources are brought to bear adequately at appropriate times.

Coordination refers to guiding the conduct of KM in an organization. It involves managing dependencies among knowledge resources, among knowledge manipulation activities, between knowledge resources and other resources (i.e., financial, human, and material), and between knowledge resources and KM activities. It involves marshaling sufficient skills for executing various activities, arrangement of those activities in time, and integrating knowledge processing with an organization's operations. Coordination approaches suggested and used include linking incentives to desired KM behaviors and outcomes, guiding knowledge manipulation activities, establishing facile communications channels for knowledge flows, and constructing programs to encourage learning. An organization's approach to problem solving, decision making, experimentation, and organizational learning - all of which are knowledge-intensive endeavors - can depend on how it coordinates its KM activities. Two categories of knowledge coordination are Structuring Efforts (determining appropriate communication channels for knowledge flows, configuring KM episodes, developing common process vocabulary etc.) and Securing Efforts (making of the concepts of KM real, aligning rewards and performance evaluation, motivating employees to perform KM activities etc.).

4.9 Knowledge Leadership Module

In Table 2, knowledge leadership refers to establishing conditions that enable and facilitate fruitful conduct of KM. Of the four secondary KM activities, leadership is primary. It sets the tone (i.e., shapes the culture) for coordination, control, and measurement. It qualifies the expression of each primary activity. In short, leadership establishes enabling conditions for achieving fruitful KM through the other eight activities. The distinguishing characteristic of leadership is that of being a catalyst through such traits as inspiring, mentoring, setting examples, engendering trust and respect, instilling a cohesive and creative culture, establishing a vision, listening, learning, teaching, and knowledge sharing. A study by Andersen and APQC stated that one crucial reason why organizations are unable to effectively leverage knowledge is because of a "lack of commitment of top leadership to sharing organizational knowledge or there are too few role models who exhibit the desired behavior" (Hiebler, 1996). "...knowledge management is as much about leadership, culture, and behavior," states Neil Ashton, Head of British Petroleum's Information Technology Architecture and Strategy.

John Kotter, a Harvard professor, makes distinctions between management (i.e., planning and budgeting; organizing and staffing; controlled problem-solving; predicting results) and leadership (i.e., vision of the future; aligning people; motivating and inspiring; creating change) (Amidon and Mahdjoubi, 2003). Knowledge leadership activities may be categorized as Planning (developing KM action plan, focusing the KM vision and practice to support and align with enterprise strategy, leveraging what is known to grow and build the business etc.) and Executing (creating a culture conducive to internal benchmarking, making knowledge sharing a guiding principle for the organization, empowering people to create and add to the KM system etc.).

For each of the above modules, we can explore and examine the competitiveness role of each KM activity in the Knowledge Chain in terms of the PAIR (productivity, agility, innovation, and reputations) approaches.

5. Course Resources

Course resources add value to a KM course. In this regard, Ruth et al. (2003) presents quite a comprehensive list of books (classics and others), articles, case studies, and web-based resources in their paper. The two-volume series, Handbook on Knowledge Management, edited by Clyde Holsapple (2003); the reference book titled Knowledge Management in Modern Organizations, edited by Murray Jennex (2007); and The New Edge in Knowledge by O'Dell and Hubert (2011) are an extensive, fundamental reference work for the knowledge management field. KM instructors can map the above described nine modules to these resources. Table 3 lists some of the current *classic* KM related books that discuss the activities in each of the nine KM modules. These classics not only give a historical perspective of the KM field, but also provide timeless ideas. The lessons of the classics carry as much weight as ever.

Table 3: Selected Classic KM Books that Cover Knowledge Chain Activities

Current KM Classic Books	KM Modules Mainly Covered
<i>Corporate Instinct</i> (Koulopoulos et al., 1997)	Knowledge Measurement, Knowledge Control, and Knowledge Coordination
<i>Cybercorp</i> (Martin, 1996)	Knowledge Leadership, Knowledge Coordination, and Knowledge Control
<i>Information Ecology</i> (Davenport, 1997)	Knowledge Acquisition, Knowledge Selection, Knowledge Generation, and Knowledge Emission
<i>Intellectual Capital: The New Wealth of Organizations</i> (Stewart, 1997)	Knowledge Measurement, Knowledge Leadership, and Knowledge Control
<i>The Knowledge-Creating Company</i> (Nonaka and Takeuchi, 1995)	Regarded as the most esteemed book, it deals with all the nine KM modules applied in Japanese companies.
<i>Wellsprings of Knowledge</i> (Leonard-Barton, 1995)	Knowledge Leadership, Knowledge Coordination, and Knowledge Control
<i>Working Knowledge</i> (Davenport and Prusak, 1998)	Knowledge Generation, Knowledge Assimilation, and Knowledge Emission

A graduate level course such as a KM course often benefits from the application of case studies. Case facilitates the understanding of concepts and students usually enjoy them because they present different aspects, good and bad. Cases emphasize that there is no single “right” approach. Table 4 presents some useful example cases for the KM modules. All the listed Web sites were accessed on January 28, 2012.

Table 4: Selected Case Studies that Elucidate Knowledge Chain Activities

KM Module	Activity to Add Value	Stated Competitive Impact
Acquisition	Monitoring, rapidly acquiring, and invoking knowledge for new technological advances for steel products at Chaparral Steel. http://www.iisd.org/business/viewcasestudy.aspx?id=51	Productivity, agility, innovation.
Selection	American Airline’s SABRE reservation system locates, filters, and extracts knowledge about competing and successful flights offered by competitors as a basis for generating knowledge about competitive countermeasures to implement those routes. http://www.sabretravelnetwork.com/home/about/history/	Innovation
Generation	IBM is implementing “Knowledge Cockpit” system employing advanced knowledge-mining techniques to evaluate, discover, and synthesize high-quality knowledge for its professionals to use in helping clients to be successful in their business. http://www.itsmportal.com/tools/kc-knowledge-cockpit	Productivity, agility, reputation
Assimilation	McDonalds generates knowledge pertaining to standards, aspirations, and product-mix and service decisions. Effectively assimilating this knowledge is a key driver of value. http://www.ceibs.edu/knowledge/papers/images/20060317/2847.pdf	Reputation
Emission	Ernie , an on-line consulting system from Ernst & Young, externalizes knowledge customized for targeted clientele who cannot afford in-house consultants. Ernie allows consultants to be more productive and makes their knowledge more readily available to a new market. http://www.washingtonpost.com/wp-srv/washtech/techcareers/qandas/qa082098.htm	Productivity, reputation.
Measurement	British Petroleum, an advanced practitioner of KM, uses clearly defined objectives that have made the measurement of KM results much easier. This has resulted in significant business improvements and helped convince senior management of the benefits of KM. http://www.wahansa.com/portfolio/km_behindthebuzz.html	Productivity
Control	Dow undertook patent maintenance by assessing, categorizing, and protecting this valuable knowledge resource from loss and obsolescence. These patent maintenance initiatives have earned Dow a high income through licensing its technology and make that knowledge more readily accessible to research, manufacturing, and marketing staff. http://www.anagua.com/community/patent_renewals_challenge.pdf	Productivity, agility.
Coordination	To promote effective coordination, DuPont & Co. is breaking down the traditional organizational hierarchy on its plant floors This facilitates communication channels for knowledge flows among workers and has made them more productive. http://tao.nuk.edu.tw/KM/StrategyKBS.pdf	Productivity
Leadership	BP’s leadership’s vision of being a world-class, global, agile learning organization via knowledge management is implemented via the COE system. COE isn’t just about technology but also about changing behavior and culture in a way that added value significantly to the organization. http://www.bp.com/liveassets/bp_internet/globalbp/STAGING/global_assets/downloads/C/coc_en_full_document.pdf	Productivity, reputation, agility, innovation.

6. Approaches to an Introductory KM Course

Each of the nine core modules delineated above provides a specific coverage of KM topics. For example, the knowledge acquisition module deals mainly with identifying appropriate knowledge, capturing the identified knowledge, organizing the captured knowledge, and transferring the organized knowledge. However, we recognize that many approaches or emphases for KM courses are possible depending on the instructor's interests and the student needs. For example, an instructor may simply wish to focus on KM's human/personnel aspects. Therefore, we propose some different approaches that cover different proportions of the nine core modules. Each approach emphasizes a particular body of knowledge as a focus of learning. It is inevitable that some approaches may overlap. It is assumed that each of the following approaches would begin with some history, underlying KM concepts, and the lingua franca of KM, e.g., tacit vs. explicit knowledge, knowledge workers etc.

6.1 Primary KM Activities Approach

This approach will focus only on the five primary activities of the Knowledge Chain model (acquisition, selection, generation, assimilation, and emission) and their impacts in terms of one or more of the PAIR approaches. The degree of involvement of technology in each of the primary activities can be examined.

6.2 Secondary KM Activities Approach

This approach will focus only on the four secondary activities of the Knowledge Chain model (leadership, coordination, control, and measurement) and their impacts in terms of one or more of the PAIR approaches. The degree of involvement of technology in each of the secondary activities can be explored.

6.3 Leadership, Management, and Culture Approach

This focus addresses the role of leadership in KM and the importance of enhancing an appropriate shared organizational culture. It explores knowledge, where it resides, whether it can be managed, or whether it can be a source of competitive advantage. This approach should focus on leadership, coordination, and control activities of the Knowledge Chain and their impacts in terms of one or more of the PAIR approaches. The use of technology in each of the participant KM activities can be explored.

6.4 Knowledge Process and Codification Approach

Chaudhry and Higgins (2001) categorize knowledge process and codification as knowledge audit, capturing and acquisition of knowledge, knowledge mapping, organization and categorization of knowledge resources, developing and maintain knowledge repositories, search and retrieval, use, and re-use of knowledge. This emphasis can include acquisition, selection, generation, assimilation, emission, and measurement activities of the Knowledge Chain model together with the application of relevant technology.

6.5 Knowledge Management Application Approach

This will include all the nine KM activities of the Knowledge Chain model and their impacts. Suitable topics in this approach are considerations for KM applications in different sectors and industries, implementing a KM project in an organization, case studies and success stories of KM applications. A general overview of commonly used technologies in each of the KM activities can be discussed.

7. Conclusion

Knowledge is indeed a precious asset, and conscious and active management of which can bring significant contribution and benefits to the organization. Even though knowledge management has been practiced and reported with major success stories in the real world for quite some time, the leveraging of this body of practice is barely represented in university courses. We present a structure of 9 core modules and 5 emphases that should make it easier for an instructor to make the intellectual commitment to teach a KM course. We believe that the Knowledge Chain model, field tested with empirical evidence, can provide useful guidance to educators to create core KM teaching modules with many approaches and emphases. Knowledge management is such a powerful and vital topic that it won't be long before it moves across curricula encompassing different disciplines.

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