

A University-based Approach to the Diffusion of Knowledge Management Concepts and Practice

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ABSTRACT

This paper addresses the diffusion of Knowledge Management concepts, principles, and cases into university courses. Although we are now living in a world of gigabit transmission systems and terabyte storage, there are still long delays that often occur before industry practice finds its way into university courses. Knowledge Management practices have been elaborated in books, articles, cases, and symposia for almost a decade, with particular acceleration during recent years. Yet only a small number of universities offer KM courses, and few are offered at top business schools. In order to speed the assimilation of KM courses to universities, we describe the essential tools and resources needed in order to give our colleagues a head start in the preparation for KM courses. We also hope to facilitate the university's traditional role as an agent for diffusing best practices and sound principles to a broader audience. To achieve this, we present an approach that brings together the intellectual territory, books, resources, and a few early lessons we have learned into a "toolkit" that should aid teachers in several disciplines in planning and delivering KM courses at the university level.

The resources for KM teaching are abundant and include dozens of books, hundreds of articles, extensive WWW resources, and a fast-growing group of cases. We provide samples of the most suitable resources. The crucial question for preparing a KM course is the intellectual territory that can be covered. We present eight recommended modules, including: Knowledge Creation, History of KM Theory/Concepts, The Importance of Trust, Knowledge Coding, and Hardware/ Software/Systems, KM ROI/Evaluation. Since many approaches or emphases for KM courses are possible, we suggest four examples, each including different proportions of the core modules. These course approaches are: Current Industry Practice, KM History, Concepts and Theory, Human/Personnel Factors, and Hardware, Software,

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SIGCPR '99 New Orleans LA USA

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and Systems. A matrix matches resources, modules, and approaches to help a professor personalize and save considerable time in the preparation of a KM course. KM seems ready to evolve into a robust body of concepts and practices that will be taught far beyond business schools. We hope that the concepts and recommendations presented in this paper will speed the diffusion process.

Keywords

Knowledge management, knowledge generation, knowledge codification and classification, knowledge transfer, Chief Knowledge Officer, diffusion of IT practice, trust-based organizations, corporate strategy.

1. INTRODUCTION

Universities are sometimes accused of being responsible for an unnecessary delay in bringing new organizational practices to students. 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 Motorola, Disney, General Electric, General Motors, etc. [7, p. 34]. If graduate students of fifteen years ago were interested in the strategic and tactical use of expert systems in large companies, such as DuPont, DEC, General Electric or Campbell Soups, they had to wait half a decade or more before sufficient courses, books, and articles became available. Once the materials were available, there were further delays in the diffusion of best teaching practices to the professors who taught the courses. This long delay between actual practice and diffusion to university courses also occurred in Computer-Assisted Systems Engineering (CASE), Business Process Reengineering (BPE), Enterprise Resource Planning

(ERP), and other IT interventions. Unfortunately, KM seems to be following a similar trajectory.

A decade ago, Peter Drucker (1988) called attention to the primacy of knowledge assets in the future success of companies. KM practitioners began to be identified in the early 90's (for example, [13]), and by 1994 many articles addressed the importance of the individual employee's knowledge as opposed to the company's databases and reports (for example, [2]). During the past five years, KM has become the focus of considerable attention. Scores of articles, including those in *Sloan Management Review*, *Harvard Business Review*, and other respected journals, have addressed the KM process as if it were a mainstream discipline. That same period has witnessed the appearance of nearly forty KM-related books and dozens of business cases, plus increasingly well-attended seminars and symposia. Currently, several journals focus exclusively on KM processes and practices. Parallel with this activity, a well-understood body of terms, a lingua franca, is emerging: implicit and explicit knowledge, knowledge markets, middle up-down management, the knowledge cycle, creative abrasion, and knowledge mapping, among many other terms. Hundreds of companies around the world are committed to KM principles and processes, including many of the Fortune 500 firms [17, p. 154]. While it is difficult to predict if KM programs will be run at the enterprise level, by a CKO, or within business units, KM is certainly becoming part of corporate culture, diffused throughout organizations in the same fashion as safety consciousness [1]. Thus, KM seems to have "arrived," and we hope to facilitate diffusion of this important body of knowledge to the academy.

The aim of this article is to offer enough information to enable a qualified university instructor to deploy a good course in KM in a much shorter time than would previously have been possible. We believe that the suggestions put forth here could be particularly useful, based on the results of a study recently completed by one of the authors [20]. The top 25 MBA programs in the U.S., based on *U.S. News and World Report's* 1998 rankings, were contacted in order to determine the degree to which KM courses were being initiated. 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. Based on this sample, we believe that many, probably most, of the over two hundred accredited US business schools do not have KM courses yet. At the same time, we also believe that KM is destined to become much more than an elective course, that is, only available to a small number of students. The body of knowledge and practice is too broad to limit KM to courses taught occasionally in schools of business. KM has legitimate roots in philosophy, sociology, and psychology. It also has relevance across the academy, primarily in business, but also in computer science, public policy, and medicine, at a minimum. Eventually, a set of formal elements for

KM courses will be developed and professional bodies will agree on them. However, until there is agreement and dissemination, interim approaches are needed.

A professor preparing a new course needs to have answers to many questions: Which books and papers comprise the essential intellectual territory? Which combinations of texts and other materials are most compatible? What and where are the learning resources, papers, web sites, and course pages? Who are the main players, the respected, quoted, and imitated persons in the field? In a few years, these questions will be answered by consensus as KM theory and practices are regularized. For now though, there is a definite need to answer these questions preliminarily so that KM can be presented to a broad spectrum of university students, with less of a delay than has occurred in the diffusion of other IT practices.

Our perspective on the diffusion process is that of participants/observers. Under the auspices of the School of Management, we developed a robust KM course (*Leveraging Information Technology - Knowledge Management*: <http://icasit.gmu.edu/km/index.htm>) for over thirty graduate students at George Mason University, Fairfax, Virginia, a large, state-supported university, for the Fall semester of 1998. The course provided significant resources, including one of the most comprehensive university resource sites for KM research available anywhere (<http://www.icasit.org/km/>). While administering the course, we observed the techniques and materials that seemed to work well, and also noted those that did not appear to be suitable. We have also contacted some of the other professors teaching KM courses in the United States and have included their insights below.

2. WHY IS KM PARTICULARLY 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 electives, such as BPE or Expert Systems. First, KM is mostly about management, not software or hardware, and the protagonists in cases and lessons can be inherently more interesting. It is not unusual for the Chief Executive Officer to be at the center of the process. Two of the best-known cases used for teaching involve British Petroleum and The World Bank. In these apparently very successful implementations, the spokesmen who articulate KM strategy are not the chief information officers, but Mr. John Brown, CEO of BP [15] and Mr. James Wolfensohn, president of the World Bank [8].

Second, unlike many of the MIS texts, which primarily celebrate success stories, these early cases and examples of KM implementation show examples of both successes and failures. For example, when discussing the battle to extract crucial product

knowledge for competitive advantage in the early 1990's, Sears' and Kmart's failures are frequently discussed in the KM literature and contrasted with Walmart's successes (for example, [4, p. 63]). 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 is that it can be presented from many different perspectives or points of emphasis. Depending upon the setting or context, a course could emphasize an historical framework beginning with Plato and Aristotle and migrate across the disciplines of philosophy and economics to a point where some of the basic concepts, such as tacit and explicit knowledge, 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. We present examples of four such approaches later.

3. COURSE RESOURCES

3.1 Books That May be Used in a KM Course

Many recent books, such as those shown below, would add value for some part of a KM course, but we have categorized seven as being "early classics." By examining many of the articles and cases already widely circulated, we find the "classics" to be the most relevant to a KM course as of Fall 1998. We freely admit, however, both that the definition of classic is hazy and that next year's list of classics may be completely different. Each of these books has been widely referenced and proves popular in class. The authors of our classics are also frequent contributors at industry meetings and symposia, are active consultants, and have developed well respected approaches to KM practice. Yet none of these books present everything needed for a good KM course.

3.1.1 Current "Classics"

Corporate Instinct, T. Koulopoulos, R. Spinello and W. Toms, (New York: Van Nostrand, Reinhold, 1997)

Cybercorp, J. Martin, (New York: AMACOM, 1996).

Information Ecology, T. Davenport (New York: Oxford University Press, 1997)

Intellectual Capital: The New Wealth of Organizations, T. Stewart, (Doubleday, Currency 1997)

The Knowledge-Creating Company, I. Nonaka and H. Takeuchi, (New York, Oxford Press 1995)

Wellsprings of Knowledge, D. Leonard-Barton, (Boston: HBS Press, 1995)

Working Knowledge, T. Davenport and L. Prusak, (Boston: HBS Press, 1998).

3.1.2 Other Knowledge Management Books

Advances in Knowledge Discovery and Data Mining, U. Fayyad and others, editors, (Menlo Park: AAAI Press, 1996)

The Distributed Mind, Fisher & Fisher, (New York: AMACOM, 1997)

Knowledge-Enabled Organization, D. Tobin, (New York: AMACOM, 1997)

The Knowledge Evolution, Expanding Organizational Intelligence, V. Allee, (Boston : Butterworth-Heinemann, 1997.)

Knowledge for Action, A Guide to Overcoming Barriers to Organizational Change, C. Argyris, (San Francisco: Jossey-Bass, 1993)

Knowledge Management and Organizational Design, P. Myers, (Boston, Butterworth-Heinemann, 1996)

Liberation Management, T. Peters, (New York: Fawcett Columbine Books, 1994)

Maintenance of Knowledge Based Systems, F. Coenen and T. Bench-Capon (San Diego: Academic Press, 1993)

Managing Knowledge, S. Albert and K. Bradley, (Cambridge University Press, 1997)

Managing Knowledge, G. Van Krogh and J. Roos, eds. (London: Sage, 1996)

The New Organizational Wealth: Managing and Measuring Knowledge-Based Assets: K. Sveiby, (San Francisco: Berrett-Koehler, 1997)

Each of these books present advantages and disadvantages for classroom use. *Corporate Instinct* provides excellent insights about practicing and measuring KM, but it does not discuss KM process details. *Cybercorp* is a popular, widely used primer on management in the Internet era and supports KM strategy, but devotes relatively little attention to KM implementation. *Information Ecology* presents an interesting perspective on implementing KM, but it emphasizes the IT management level, thus shortchanging some strategic issues. *The Knowledge-Creating Company*, perhaps the most esteemed textbook, describes not only KM antecedents, but also details some of the earliest teachable cases, which occurred in Japanese companies in the 1980's. *Wellsprings of Knowledge* presents a broad view of the key management issues of knowledge creation in manufacturing firms, including the idea of core competencies and core rigidities, but it is industry-specific, not general, in its emphasis. Perhaps *Working Knowledge* presents the most down-to-earth approach. It brings many of the concepts that have been elaborated elsewhere by Davenport (knowledge markets, knowledge generation, etc.) and offers practical and pragmatic examples of implementation issues. However, it does not give the breadth of history and practice of KM that other texts offer. *Intellectual Capital: The New Wealth of Organizations* presents a rationale for evaluating the true value of Knowledge in an organization in financial terms.

3.2 Case Studies for KM Courses

A graduate level course often benefits from the application of case studies, and a KM course is no exception. Cases facilitate the

understanding of concepts and are usually enjoyed by students because many solutions are possible – no single "right" approach exists. In a graduate course called "Managing Knowledge in the Information Age" offered at Boston College (www.bc.edu) in Spring 1998, Professors Richard Spinello and Thomas Koulopoulos used over a dozen case studies, some as group exercises and others for a class project [10]. Another innovative course offered by Omar El Sawy at the University of Southern California (www.marshall.usc.edu) included a course pack containing 5 cases and 8 articles [6]. Samples of such cases are listed below. By our estimate, there are over thirty cases available for use in KM courses, most published by *Harvard Business Review*, but some others by Stanford Business School and the Delphi Group.

3.2.1 Sample Cases

Sample Cases used in KM courses taught at Boston College [10], University of South Carolina [6], and George Mason University [16]:

- Connor Formed Metal Products (HBS)
- No Excuses Management (HBS)
- Colliers International Property (HBS)
- Open Market Case (HBS)
- Interview with John Browne (HBS)
- Buckman Labs (Delphi)
- CEO of British Petroleum (HBS)
- KPMG-Peat Marwick-One Giant Brain
- KM at Ernst and Young (Stanford BS)
- Group Health Cooperative – Knowledge Management with a Human Touch (Delphi)

3.3 World Wide Web Resources for KM Courses

Today, WWW resources are so extensive and comprehensive that a significant part of the research component of any course can be WWW-based. There are currently several dozen WWW sites that are dedicated primarily to KM. Some of these are designed for researchers, offering links to on-line articles as well as industry sites that carry new product information. Table 1, below, lists the current sites that we have found to be the most valuable. To be

included, the sites have to be well maintained, focused mostly on KM, and have obvious value for student research.

We have developed one such site at The International Center for Applied Studies in Information Technology (ICASIT) at the School of Management, George Mason University (www.icasit.org/km/index.htm). Currently one of the most extensive of the university-based sites, it presents descriptions and links to over thirty of the most popular KM-focused WWW sites. In addition, it provides links to several dozen business cases related to KM implementation. The site also lists many books and on-line articles, as well as provides a direct link to

Resource	Category	Address	Comments
BRINT - A Business Researcher's Interest	KM OL GB	www.brint.com/km	Excellent KM site with special business features
KM World	KM	www.kmworld.com	Broad coverage including reviews of other KM sites.
KM Central, George Mason University, School of Management	KM	www.icasit.org/km/index.htm	Comprehensive collection of KM links, case studies, articles and books.
World Bank's Report on KM	KM	www.worldbank.org/html/fpd/technet/wdr98/world.htm	Detailed study of Bank's KM applications

Ernst & Young's Knowledge Advantage Colloquium	KM	www.ey.com/knowledge/colloquium.asp	Detailed information on Bank's KM approach and results.
The KM Forum	KM	www.km-forum.org	Helpful sections of KM-related papers, links and discussions.
Knowledge, Inc.	KM IC	www.knowledgeinc.com	Exceptional selection of online articles, interviews and links.
Federation for Enterprise Knowledge Development (FEND)	KM OL	www.fend.es	Good discussions on KM
Univ. of Texas KM Server	KM	www.bus.utexas.edu/kman/	Resources, books and articles., FAQ
Intranet/KM Resource Center	KM WR	www.uni-hohenheim.de/~miepple/ikcenter.html	Good collection of links to online articles and other KM sites.
American Productivity & Quality Center	KM GB	www.apqc.org/topics/topic02.cfm	Good overall KM resource. Practical examples.
Delphi's Virtual International KM Summit	KM	www.delphigroup.com/pubs/KMWebPub.htm	Virtual KM conference.
KM Metazine	KM	www.ktic.com/topic6/km.htm	Online magazine: KM, from rhetoric to business reality.
CIO KM Research Center	KM GB	www.cio.com/forums/knowledge/resource_links.html	CIO Magazine's KM Resource Center.
KM Associates	KM	www.knowledge-at-work.com	Online magazine dedicated to KM practice
Knowledge Online, UK Site	KM	www.knowledge.org.uk	International KM links

Table 1 - Selected World Wide Web Sites Focusing on Knowledge Management*

*Category Abbreviations: **GB** - General Business Content, **IC** - Intellectual Capital, **KM** - Knowledge Management, **OL** - Organizational Learning, **PT** - Products & Tools, **WR** - Web-related

Harvard Business School Publishing's web site (<http://www.hbsp.harvard.edu/home.html>), which has extensive listings of articles and books related to KM. The ICASIT site also provides links to many companies that have been associated with advanced use of KM principles, such as Chaparral Steel, Boeing, World Bank, and Monsanto. The Brint site, which is also linked to ICASIT's site, offers a newsletter aimed at senior managers and includes many articles on KM as well as many useful links to other management studies affecting KM. The University of Texas site has several unique features, including product reviews (KM software), Frequently Asked Questions (FAQ's) and Lexicon, plus a comprehensive list of recent journal articles about KM.

4. CORE INGREDIENTS IN A GRADUATE KM COURSE- THE INTELLECTUAL TERRITORY

Here we describe the modules that might constitute a KM course, stipulating beforehand that no course will be able to encompass all of the modules. In describing these modules, we assume a generic graduate course in KM that would involve about 40 student-

contact hours. Only some of the modules would receive major emphasis, that is, require two or three lectures.

4.1 Knowledge Creation module

This topic is central to any course in KM, since it introduces the differences between knowledge and information, the basis of KM. Examples from Japan in *The Knowledge-Creating Company* (especially chapters 4, 5, and 7), as well as extensions to US companies, are fundamental to this module. The subject of seeking knowledge from external sources, a common practice, is discussed particularly well in *Working Knowledge* (chapter 3) and *Wellsprings of Knowledge* (chapter 6).

4.2 History of KM Theory/Concepts module

Most of the KM textbooks begin almost immediately with concepts, followed by practical examples. *The Knowledge-Creating Company* (chapters 2-3) combines economics and philosophy over a span of two millennia, showing the progression from the fundamental question "What is knowledge?" to current practice in manufacturing firms.

4.3 Importance of Trust module

All reported cases in KM show a trait common to all successful organizations: a large element of trust, both downward and upward. Trust must be present so that employees know their contributions are valued and that the reward structure favors their being open and forthcoming with knowledge. Without this inherent trust, "knowledge hoarding" takes place, and KM processes cannot be implemented successfully. Most textbooks and cases highlight this, so the resources available to cover this important module are extensive.

4.4 Strategic Issues in KM module

The examples of CEO's championing KM in their companies, described earlier, make it clear that KM is an important component of corporate strategy, not just tactical deployment of a new approach or software tool. Nearly all of the texts and cases discuss strategy also. For example, *Information Ecology* (chapter 4) gives detailed principles for developing KM strategy. A particularly useful resource for this emphasis is *Corporate Instinct*, which is similar in its fast-paced approach to *Cybercorp*. The instinct described in the text is a differentiator, a sense of urgency, and a highly developed ability to react quickly and positively to change and to new knowledge. These authors provide specific guidance for setting a strategy to develop corporate instinct and include a checklist for evaluating success.

4.5 Knowledge Coding module

This module examines some of the challenges presented by the identification of knowledge as opposed to information or data. Data elements such as "customer" are ambiguous in the organization. Is a customer a person who has bought a product or a potential buyer? Coding is crucial for many types of knowledge transfer and is essential to the selection and implementation of new systems. *Working Knowledge* (chapter 4) is a valuable source for this module.

4.6 Hardware/Software/Systems module

KM implementations do not always involve major investments of hardware and software. In many cases the human issues of trust, cooperation, and sharing can accomplish much of the needed agenda. But most of the larger organizations implementing KM also have found it necessary to invest in changing major systems that array, catalog, and store knowledge in more convenient ways. Many, such as British Petroleum, invest in special workstations, at least for pilot programs. The World Bank, with over eight thousand employees around the world, has made a major investment in KM software and training, but retains Lotus Notes as the interface. The Bank's KM planning process, assisted by Booz Allen & Hamilton, makes an interesting course resource [21].

4.7 KM ROI/Evaluation module

Most organizations implementing KM practices present several rather dramatic examples of exceptional performance, anecdotes

that typify, rather than cost-justify, the results achieved. An entire course could be taught around evaluation methods for KM, because discussing the available evidence can be fascinating for students, since the gains are often spectacular. Beginning with Nonaka's Matsushita case of more than a decade ago, through current case studies such as those for Ernst and Young, Hoffman LaRoche, Hewlett Packard, and British Petroleum, the student obtains a useful insight for the types of savings that can be achieved, as well as the investments required to achieve them. *Information Ecology* (chapters 6 and 12), and *Working Knowledge* (chapters 1 and 8) describe payoffs for the companies just mentioned and at least forty more. *Intellectual Capital* is perhaps the most complete resource for examining the return on investment issue in a practical context, and could be the basis of a course by itself.

4.8 International Issues module

This segment in a KM course could be integrated with others, but it is useful to devote some time to the role of regional culture and tradition in the development of KM programs. Companies such as Ford, Intel, and Coca Cola, which are transnational in their management and control practices, confront issues that differ from those of an international company such as Caterpillar, which tends to keep more of the controls in the home office in Peoria. *The Knowledge-Creating Company* (chapter 7) presents a helpful approach to this subject by discussing the problems of "going global" in the context of differences between Japanese and US uses of KM. For example, in Japan the intersection of tacit and explicit knowledge occurs at the group level, while in the US it occurs at the individual level.

5. PUTTING IT ALL TOGETHER- FOUR APPROACHES TO AN INTRODUCTORY KM COURSE

We have described the resources currently available to the KM course developer: books, cases, articles, and WWW facilities. We have also recommended basic course modules. Here, we outline four types of KM courses that could be developed, depending on the professor's interests and the student's needs. Each approach emphasizes a particular body of knowledge as a focus for learning.

5.1 Approach 1 - Orientation Toward Current Industry Practice

Current practice orientation would emphasize implementation issues over theory and concepts. *Working Knowledge* and *Information Ecology* use this orientation and give dozens of examples from the authors' consulting practice. This orientation would be relatively easy to present to graduate students since it is laced with lessons learned, "how to" ideas, and extensive examples of real world situations where KM has made a difference in the profitability of firms. Also, it would facilitate the early use of the lingua franca of KM, e.g. tacit vs. explicit knowledge, creative abrasion, knowledge markets, reciprocity, etc.

5.2 Approach 2 - Orientation Toward History, Underlying Concepts, and Theory

This approach would be more challenging, but potentially more rewarding, for both student and professor. *The Knowledge-Creating Company* and *Wellsprings of Knowledge*, among the

most respected KM sources, used together, would provide an ideal body of knowledge for this approach. *The Knowledge-Creating Company* emphasizes history in its early chapters, and both texts give excellent descriptions and case studies of concepts and theory, using the manufacturing industry as a focus.

5.3 Approach 3 - Orientation Toward Human Factors and Personnel Issues

This approach would open KM studies to a broader group of students, including those specializing in Public Administration, Communications, Psychology, and Sociology, as well as Business Administration. *Wellsprings of Knowledge* develops the concept of a company's core competencies, and the opposite, core rigidities. It also mentions a knowledge creation cycle that consists of activities such as problem solving, integration, implementation, and importation of knowledge. The model is very helpful since it can explain the presence or absence of good KM practice in an organization. *Corporate Instinct*, more than any of the other KM texts, deals with human motivations to accept the difficult challenges of a knowledge corporation. Students enjoy the book because of its focus on practical and implementable approaches. Taken together, these books would facilitate the student's understanding of the human dimension of KM implementation processes.

5.4 Approach 4 - Hardware and Software Orientation

While dozens of "Knowledge Management" software products are available [19], relatively little information exists that compares the effectiveness of one vs. another. This course, which could be offered to computer science, software engineering, and other IT subdisciplines, as well as MBA candidates, could be aimed primarily at case studies and experiments. The *Information Ecology* and *Cybercorp* texts could be used for overview purposes. Both deal with the systemic changes that must take place in IT organizations to cope with competitive forces. Invited lecturers from software and systems integration companies, plus demonstrations of KM groupware would make it possible for students to concentrate more on IT hardware/software issues than in any of the other emphases.

Course Emphasis

	Industry Practice	KM History, Concepts/Theory	Human Factors/ Personnel	Hardware Software/ Systems
Appropriate Disciplines of Students	Business	Economics, Business, Public Policy	Public Policy, Business	Business, Computer Science
Recommended Texts	<i>Working Knowledge, Information Ecology, Intellectual Capital</i>	<i>Knowledge-Creating Company, Wellsprings of Knowledge</i>	<i>Wellsprings of Knowledge, Corporate Instinct</i>	<i>Working Knowledge, Cybercorp</i>
Examples of Cases	KPMG, Microsoft, Ernst and Young, Dow	Matsushita, GE, 3M, Canon, HP, Chevron	Chapparral Steel, DEC, IBM, Colgate	British Petroleum, IBM, Microsoft

Examples of class projects	KM system design and implementation evaluations.	Teams examine key Japanese firms through WWW and cases, VCR	Import "live" projects from industry, government and the university	On-line groupware, equipment/software/systems evaluations
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Table 2 - Knowledge Management Teaching Approaches - Graduate Course

	Course Emphasis			
	Industry Practice	KM History/ Concepts/Theory	Human Factors/ Personnel	Hardware/ Software/Systems
Knowledge Creation	Moderate	Moderate	Major	Moderate
History of KM Theory/ Concepts	Minor	Major	Minor	Minor
Importance of Trust	Major	Major	Major	Major
KM Strategic Issues	Major	Moderate	Moderate	Minor
Knowledge Coding	Moderate	Minor	Major	Major
Hardware/Software/ Systems	Minor	Minor	Minor	Major
ROI in KM (Evaluation)	Minor	Moderate	Minor	Moderate
International Issues	Minor	Moderate	Minor	Minor

Table 3 - Relative Importance of Modules for Knowledge Management Courses Arrayed by the Four Areas of Emphasis*

*Major: 10-20% of course devoted to the module; moderate: 5-10%; minor: 0-5%.

6. DEVELOPING A KM COURSE - LINKING COURSE EMPHASIS AND MODULES

Tables 2 and 3 connect the four course emphases with the eight modules. Table 2 summarizes the target audience and course resources. Table 3 suggests the amount of course coverage for each module. An instructor could vary the doses as appropriate. The course could be tailored to any other emphasis, based on the needs of the class and the organization. It is easily possible to visualize a sequence of a half dozen courses, including industry-facilitated seminars and practicums.

6.1 An Example of a New KM Course

To illustrate the modular approaches just described, we give a brief description of a graduate course taught by us at George Mason University, as an elective open to students in the School of Management or the School of Engineering [16]. The course site can be found at <http://icasit.gmu.edu/km/index.htm>. The course emphasizes the Industry Practice approach in tables 2 and 3 and consists of four components. In the first part of the course, the students spend considerable time examining the concepts and cases associated with *Working Knowledge* and *Information Ecology* and write analyses of some of the key approaches, such

as after action reviews, cataloging, information politics (monarchy, anarchy, federalism, feudalism), trust-based knowledge sharing, and reward systems. After mastering this intellectual territory, the class focuses on individual or team-based reviews of organizations that have been applying KM principles in real world situations. The deliverable here is a term paper that examines an individual company in detail – British Petroleum, World Bank, American Management Systems, or Ernst and Young, among many others. The third part of the class effort is a group of teams that prepare a web-based tutorial on KM topics, making it possible for the class, as a group, to share material that would not normally be made available beyond the teams. Topics include International Issues in KM, KM software, or KM in the Federal Government (a sample site can be found at <http://www.icasit.org/kmclass/software/>). The final project is a student research activity where a particular KM practice or process is explored in depth. Many KM leaders in local organizations such as the World Bank, American Management Systems Inc., EDS, Computer Sciences Corporation, as well as the CKO of Unilever, participated as guest lecturers and consultants to the class. Incidentally, one student in the class, as his final project, collected all of the other student's research papers and class reports, and assembled them into a large, addressable

knowledge base available to a wider community of KM users, thereby practicing what the course was preaching.

The resources we have recommended can also make it easier to introduce KM content into a course, without having the course be completely dedicated to KM. This would be possible for courses as varied as finance, accounting, management, public policy, medicine, marketing, and computer science. The use of groupware, often the subject of some class demonstrations in IT courses, would fit very well into the KM approach.

Some institutions could seriously consider separate, interdisciplinary masters degree programs in KM, integrating anthropology, business, information technology, and, possibly, psychology faculties – the matrices described in Tables 2 and 3 could be helpful in this kind of planning.

7. SUMMARY

Knowledge Management has been practiced and reported on for at least a decade, but the body of accepted practice, at this time, is barely represented in university courses. We present a structure that should facilitate the diffusion process to universities by making it easier for a professor to make the intellectual commitment to teach KM processes. As more courses appear at universities, significant changes to the understood core of KM knowledge and practice will occur. This sorting and rationalizing is what universities do best. We believe that KM is such a powerful and vital topic that it will soon move across curricula, going well beyond the business and engineering disciplines. Since KM is about refining data and information and discovering a more valuable resource, knowledge, we believe that it will someday be taught throughout the academy.

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