

Knowledge Management Education: A Framework Towards the Development of a Comprehensive Degree Program

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ABSTRACT

Knowledge management (KM) is experiencing significant growth, and a good indication of its vitality is the existence of graduate degree programs being offered worldwide. Those programs, though, do not seem to properly cover all the diverse perspectives that contribute to the discipline. This paper takes a first step in the development of comprehensive KM programs, by suggesting a framework that consolidates the content being taught and facilitate the development of future programs.

This paper surveys existing KM degree programs, analyse their content, and categorize the topics covered into four perspectives: business, knowledge, technology, and organization. By adding a 'proficiency level' dimension to assess the depth of coverage in each perspective, the paper suggests a visual summary of the *content profile* of KM programs and courses, giving an immediate clue to the emphasis given. The four perspectives and their topics, the proficiency levels and the content profile are combined into a framework that guides the development of new programs in at least two different ways: (1) by indicating topics to be covered, after the selection of the content profile most suitable for the intended audience, and (2) by allowing the flexible development of many different formats, from the course level, to KM minor and major degrees. As a first step of a long-term effort, the framework paves the way to the development of consistent and comprehensive degree programs, intended at preparing the knowledge professionals most needed in knowledge economies.

Keywords: knowledge management, knowledge management education, curriculum development, degree programs.

1. INTRODUCTION

Knowledge attracted intense and widespread attention lately. The Knowledge Era has been announced by many, we have been told to be living in a knowledge society, and companies to be competing in a knowledge economy. A sign of this surge in interest is the establishment of knowledge management as both a research field and an arena for business practice. The area has experienced an astonishing growth in the last ten years. A large number of articles, books and periodicals have been published; conferences, symposia, meetings and events have been held; research centers, associations and organizations of all sorts have been founded; job titles and positions have been created; services and products have been offered to the market. An additional evidence is that knowledge management has started to be taught in educational

institutions, first as individual courses, but now as formal graduate degree programs.

As a novel and inspiring field, knowledge management has attracted the attention of people with diverse backgrounds, and gathered contributions from varied well-established disciplines. Notwithstanding this diversity, a certain pattern can be distinguished. The many different approaches can fit one of two conflicting perspectives: a "technology-based" one or a "people-based" one. Nonaka and Takeuchi [1] describe the dichotomy between Western thought, which focuses on explicit knowledge that can be communicated in concrete ways, and the Japanese tradition, based in tacit knowledge that is deeply rooted in the individual's action and experience. Hansen et al. [2] argue for two strategies for knowledge management: a "codification" strategy, aiming for easy access and reuse of standardized knowledge stored in databases, and a "personalization" strategy, intended for sharing of innovative and flexible knowledge embodied in people. Koenig and Srikantaiah [3] describe the so-called generations of KM, the first being driven by information technology, and the second emphasizing human and cultural dimensions, with a third one just beginning, with a focus on content and its retrievability.

This dichotomy between the 'technology-side' and the 'people-side' of knowledge management is also reflected in the existing educational offerings. Degree programs on KM currently available usually focus on either the information technology perspective, considering topics like knowledge capture, storage and retrieval, or the managerial and organizational perspective, examining issues like knowledge sharing and the need for organizational and cultural change.

1.1. Goals and objectives

In this paper we take a preliminary step towards the development of a suggested curriculum for the knowledge management discipline. Our goal is to present a framework that consolidates contents being taught in existing KM degree programs. This framework is intended to facilitate the development of more comprehensive degree programs in KM, offering guidance for addressing the needs of a wide audience, in various arrangements and formats.

The framework includes the following characteristics:

- A broad perspective integrating the 'technology-side' and the 'people-side' approaches to KM, and taking into account the diverse contributions to the field.
- Coverage of the educational needs of a broad audience, especially knowledge workers, knowledge managers and knowledge officers.

- Guidance for the development of comprehensive degree programs, with flexibility to allow specific formats, such as certificate programs.

1.2. Research methodology

Our initial assumption was that the existing knowledge management programs presented partial approaches to the discipline, but, by comparing and consolidating their content, we could reach a broader perspective and get closer to a comprehensive program that integrated the competing views. Our chosen research strategy was then to survey programs being offered worldwide and analyse their content, looking for similarities and complementarities.

We first identified existing programs, examining available listings of KM courses and programs, and expanding them through Internet searches. We then collected detailed information on the identified programs, and examined the descriptions of the courses offered. The contents were categorized, and the topics consolidated in four major themes. Further analysis on the approaches of each individual course highlighted additional features needed in the framework.

We finally assessed the framework for comprehensiveness by assessing the existing programs, verifying whether the courses offered could be arranged in the framework. We also tested if the framework assisted in the development of programs and courses for specific audiences and purposes.

2. ANALYSIS OF EXISTING KM PROGRAMS

A first effort in characterizing the content presented in courses and programs¹ on knowledge management can be found in Ruth et al. [4]. The authors suggested five foci that a degree program could provide:

- Leadership, management and culture
- Organizational learning, innovation and change
- Information technology
- Library and information sciences
- Innovative or novel approaches to diffusing knowledge

Further, the authors analysed individual courses and classified their content into one or more among seven categories:

- Current industry practices
- KM concepts and theory
- Human factors and personnel issues
- Knowledge creation
- KM systems
- Expert systems
- Data mining

¹ Here, **course** means a coherent set of topics taught in a series of sessions along a certain period of time, usually a quarter or a semester. A **program** is a systematic plan of study leading to a degree, and consists of a series of courses and other complementary activities.

Another contribution was made by Srikantiah [5], who reviewed existing KM degree programs and recognized that they were being offered mainly by three types of schools: library and information science schools, computer science and engineering schools, and business and management schools. He also noted that the programs offered by each type of school followed specific approaches to the KM discipline.

Library and information science schools used to focus on information management, and presented topics like identifying information needs, locating and selecting information sources, organizing and disseminating information. Computer science and engineering schools tended to focus on technology, especially software. Topics included the infrastructure for knowledge production, acquisition and storage, application packages and coding techniques. Management schools emphasized organizational analysis and design, and organizational learning, and sometimes, management information systems.

2.1. Survey of KM programs

In the search phase, we found references to a total of 53 graduate programs in knowledge management.² Among these, 17 were not accessible during the period of this study, and 7 referred to programs that were offered only once, and not anymore (Table 1). So, we remained with 29 programs offered in a regular basis, approximately half of the initial number. We can infer from this that the mortality rate of KM programs is still high.

Table 1: References to existing KM graduate programs.

Status of the program	Certificate/Diploma	Master's	Doctoral	Total
Not accessible				17
Not regular				7
Regularly offered	4	23	2	29
Total	4	23	2	53

Those 29 programs were varied in both contents and formats. Regarding formats, there were certificate, diploma, master's and doctoral programs. The duration of the programs ranged from two semesters in the case of certificates, to six semesters, in the case of one doctoral program. Some required full-time attendance, others allowed part-time study. Some were offered entirely in a residential basis, others included distance based components, and still others were delivered completely online.

We chose to focus our analysis on master's level programs only, because they usually address a wider and deeper content, if compared to certificate and diploma programs, and have a more established and consistent set of courses than doctoral level programs, which usually have a large proportion of electives. We then narrowed to 23 programs, offered by 21 institutions.

² For this paper, we focused on programs offered in English, Spanish, and Portuguese. In the next steps of this research, we will extend the coverage to include programs offered in other languages.

Among those programs, 14 were focused specifically on knowledge management, with the totality or majority of courses on the subject (KM major), and 9 were degrees in other fields, with knowledge management as an area of concentration (KM minor). Computer science and engineering schools offered 9 of the master's programs, library and information science schools, 8, and management and public policy schools, 6 programs (Table 2).

Table 2: Types of school offering KM master's programs.

School Type	KM Major	KM Minor	Total
Management, Public Policy, Economics	2	4	6
Computer Science, Engineering	7	2	9
Library, Information Science, Communication	5	3	8
Total	14	9	23

2.2. Analysis of surveyed programs' contents

The programs' contents were collected from the course descriptions of all courses offered. Analysing those descriptions revealed to be a cumbersome and time-consuming task. Descriptions varied widely in length, accuracy, and maybe even in usefulness. We looked for major topics and issues covered in each course, sometimes not successfully. To facilitate comparison, courses with similar contents were assigned standard names.

Two courses were offered by almost all programs: "Knowledge Management Foundations" and "Knowledge Management Technologies". The first cover topics on KM in general, offering a broad view of the subject, and the second is a survey course that introduces the technologies used in KM. Other courses, presenting more specific content, were offered by at least a third of the programs. They are:

- Organization of Information and Knowledge
- Organizational Learning
- Information Storage and Retrieval
- Management of Information Organizations
- Communities of Practice
- Competitive Intelligence

In order to have a comprehensive view of the topics covered, the courses were classified according to predominant issues addressed. Seven categories were chosen, and below are a sample of topics for each of them.

- **Business-related:** e.g., competitive intelligence, business value of KM, competitive advantage, etc.
- **Context-related:** e.g., the information society, information economics, ethics and legal issues, etc.
- **People-related:** e.g., power and leadership, communities of practice, team management, etc.
- **Organization-related:** e.g., organizational design, change management, organizational learning, etc.
- **Information-related:** e.g., organization of information, information policy, information retrieval, etc.

- **Knowledge-related:** e.g., types of knowledge, knowledge life-cycle, knowledge representation, etc.
- **Technology-related:** e.g., information infrastructure, corporate portals, document management, etc.

3. DEVELOPMENT OF THE FRAMEWORK

The framework has two main parts, a *Contents* part, and a *Proficiency Levels* part. The first one was built from the analysis of surveyed programs' contents, and the second was based on IS2002, a previous work on curriculum development [6]. Those two parts combined are used to draw a *content profile* of a program or course, as described in the following sections.

3.1. The Contents part of the framework

The traditional division of knowledge management between the 'technology-side' and 'people-side' can be further detailed to give a better grasp of contents involved. From the analysis of programs' contents we concluded that the 'technology-side' usually includes a *knowledge* perspective, along with the *technology* perspective itself. Also, we found that the 'people-side' usually included a *business* perspective and an *organization* perspective. Those four perspectives can be arranged in a chart, like the Table 3.

Table 3: The Contents part of the framework. Four perspectives of knowledge management.

Business perspective Purpose, Environment, Resources	Knowledge perspective Categories, Activities, Value
<ul style="list-style-type: none"> • Knowledge economy and society, new business models, innovation • Competitive advantage, competitive intelligence • Knowledge strategy, knowledge policy • Collaboration, inter-organizational KM • Knowledge evaluation, intellectual capital • Ethics in KM, KM legal issues 	<ul style="list-style-type: none"> • General concepts and typologies on knowledge, epistemology • Knowledge life-cycle, knowledge activities, knowledge architecture • Organization of information, taxonomies, knowledge mapping • Systems theory, systems science • Information policy, knowledge protection • Cognitive science, learning
Organization perspective Culture, Structure, Processes	Technology perspective Applications, Infra-structure, Methods
<ul style="list-style-type: none"> • Organizational learning, organizational behavior, culture, power and leadership • Organizational analysis and design, change management, project management • Knowledge of management, management science • Communities of practice, team management, group creativity • Knowledge organizations, knowledge professional, knowledge entrepreneurship 	<ul style="list-style-type: none"> • Knowledge repositories, document management, corporate portals • Knowledge discovery and data-mining, business intelligence, decision support systems • Knowledge engineering, knowledge representation • Intelligent agents, neural computing, case-based reasoning • Collaborative environments, virtual communities • Systems development, KM systems development

The categories utilized in the analysis of courses' contents

could be mapped into those four perspectives: business- and context-related issues into the *business* perspective; people- and organization-related issues into the *organization* perspective; information- and knowledge-related issues into a *knowledge* perspective. The technology-related issues form a more specific *technology* perspective. These four perspectives form the *Contents* part of the framework.

3.2. The Proficiency Levels part of the framework

The analysis of courses' contents also indicated that there was a difference in the depth of coverage of each topic. We concluded that the framework should also indicate the level of proficiency expected at the end of a program. This idea is based on the well established Bloom's taxonomy of educational objectives [7], which suggests a hierarchy of learning goals, from the simplest, like defining, listing, and explaining, to the most complex, like creating, developing, and judging.

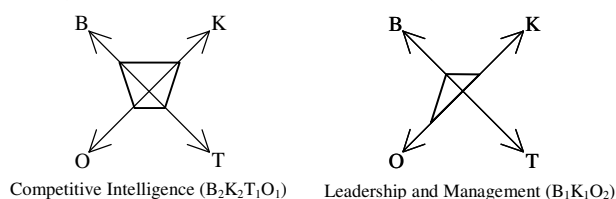
The standard curriculum for Information Science, IS2002 [6], indicates that courses can be taught at different levels of proficiency. Adapting from that work, we suggest three levels at which the content can be taught: (1) an awareness level, (2) a comprehension level, and (3) an application level. This is the *Proficiency Levels* part of the framework:

- (1) Awareness level: at this level of teaching, the student is expected to recall the topic presented. For instance, to teach 'communities of practice (CoP)' at this level is to expect students to properly refer to the concept.
- (2) Comprehension level: at this level, the student is expected to understand the topic and deal with situations where knowledge of it is required. For instance, at this level, a student of the topic 'CoP' would be expected to participate actively and effectively in a real CoP.
- (3) Application level: at this level, the student is expected to actively utilize the knowledge of the topic. For instance, at this level, a student of 'CoP' would be expected to initiate, coordinate and maintain a real CoP.

3.3. Using the framework to analyse programs

The *Contents* part, containing the four perspectives to KM, and *Proficiency Levels* part, indicating the three levels of proficiency of taught content, combine to indicate the *content profile* of program or a course. A content profile is a representation of the emphasis given to the content, as related to the proposed framework. It can be presented in either a textual or a graphical format. The examples below are two courses from different surveyed programs.

Figure 1: Content profiles of two courses, according to the framework.



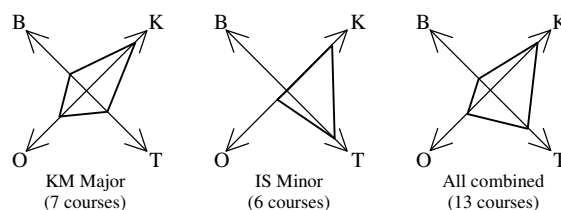
The main contribution of the framework, though, is for analysing programs as whole. This can be done by analysing individual courses and integrating the individual outcomes into an combined result. For example, one of the existing programs is a Master of Science in Knowledge Management, offered by a graduate school of library and information science. The program requires 39 semester hours of course work, corresponding to 13 courses, 7 of them being required and 6 being chosen according to two different concentrations. The Table 4 presents the analysis of the required foundation courses and sample courses in the Information Systems (IS) concentration. The numbers indicate the level of proficiency the courses target in each of the four Business, Knowledge, Technology and Organization perspectives of the *Contents* part of the proposed framework.

Table 4: Analysis of courses offered in a sample Master of Science program.

Course title	Course type	B	O	K	T
Knowledge Management	Required	1	1	1	1
Organizational Analysis and Design	Required	1	2		
Management Information Systems	Required		1		1
Knowledge Technologies	Required			1	2
Information Policy	Required	1	1	2	
Organization of Knowledge	Required			2	
Capstone Course/Practicum	Required			3	
Database Management	IS required			2	3
Inform. Systems Analysis and Design	IS required		1	2	3
Information Storage and Retrieval	IS elective		1	2	1
Searching Electronic Databases	IS elective			3	2
Metadata for Internet Resources	IS elective			3	2
Internet Fundamentals and Design	IS elective			2	3

The profile of the program as a whole can be obtained by adding up the values in each perspective and plotting the result in the *Content Profile* chart. In the Figure 2, we present the profiles of the required foundation courses (KM major) section of the program, the selected courses in the IS concentration, and the program as whole.

Figure 2: Using the framework to analyse programs.



The charts show that the required courses focus mainly on the Knowledge perspective, with some attention to the Organization Perspective. It can also be noted that the IS concentration, with those specific electives chosen, gives strong emphasis to the Knowledge and Technology perspectives, resulting in a final profile different than that of the foundation courses.

4. DEVELOPING NEW KM PROGRAMS

The framework can guide the design of a program in at least two different ways. First, in choosing its general *content profile* according to the intended audience. For instance, chief knowledge officers and senior executives in general should

have a strong focus in the Business perspective. Knowledge managers should have a good command of both Organization and Knowledge perspectives. Knowledge specialists would, for instance, want to focus on the Knowledge and Technology perspectives. The intended level of proficiency can be estimated according to the public the program should address. This then can make it possible to tailor programs according to different social settings and organizational needs.

Second, the framework can be used to design programs in a wide variety of formats. It can be used to design complete degree programs majoring in KM, but also only the concentrations in KM for degree programs in other disciplines. It is also flexible enough to guide the development of diploma and certificate programs, corporate training programs and workshops, and even the syllabus of individual courses. A typical situation would be to start with the general *content profile* of a KM degree program. After that, more specific profiles should be designed for the required courses section and each of the concentrations that are going to be offered. Finally, the courses that will be offered can be decided from the specific content profiles, and even their syllabus developed.

5. CONCLUSIONS

In this paper, we proposed a framework that facilitates the development of comprehensive degree programs. Building on existing offerings, we analysed and consolidated the contents of courses being taught into four main themes: the Business, Knowledge, Technology and Organization perspectives. Inspired by the recent effort in the computing domain, we added a 'proficiency level' dimension to assess the depth of coverage of each perspective. The framework proved to be useful in estimating the coverage and approach of degree programs currently being offered. By analysing the contents of individual courses and integrating them into a combined result, one can appreciate the emphasis given in a certain program.

The proposed framework can guide the development of new programs in at least two different ways: (1) by indicating topics to be covered, after the selection of the content profile most suitable for the intended audience, and (2) by allowing the flexible development of many different formats, from the course level, to KM minors and majors degrees.

As a first step of a long-term effort, this framework paves the way for the development of consistent and comprehensive degree programs, intended at preparing the knowledge professionals most needed in knowledge-intensive economies. This work will be further complemented with the following:

- A broader coverage of existing KM degree programs worldwide, including those taught in languages other than those included here.
- A refinement and detailing of the topics listed in the Contents part of the framework, contributing to a more established body of knowledge of the discipline.

- Profiling of target audiences of KM degree programs, e.g. knowledge specialists, knowledge managers, and knowledge officers, and their specific learning needs.

It is expected that this work contribute to the consolidation of knowledge management as an academic discipline not only for research but also for educational purposes.

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