Assessing Knowledge Management Education

Across The U.S. Department of Defense: A Multiple-Case Study

Summer E. Bartczak [1], Gary L. Wright [2], Todd A. Peachey [3], James P. Downey [1], Kaye McKinzie [1]

[1]University of Central Arkansas, [2] Air Force Operational Test & Evaluation Center, [3] Air Force Institute of Technology, USA

ABSTRACT:

The National Defense Strategy (2008b), the Quadrennial Defense Review (2006), and the Capstone Concept for Joint Operations (2009) specifically highlight a newer focus by the Department of Defense (DoD) on knowledge in operations as opposed to traditional weapons platforms. As such, each of the military services has put KM programs into place to varying degrees incorporating KM education as an aspect of implementation. Given that research on KM education is sparse and given that organizations that do not address KM education are more likely to fail with KM efforts, this multiple-case study provides a first look at KM education across the DoD. The results indicate that each of the services has different perceptions, approaches, expectations, and challenges with regards to KM education. Although some differences are necessary, the inconsistencies and lack of collaboration amongst the services may somewhat undermine the purposes for which KM programs were originally intended.

Keywords: *Knowledge management, Knowledge management education, Department of Defense, Multiple-case study*

---

1. Introduction

The U.S. military services, like other organizations, recognize that knowledge is a critical resource. The National Defense Strategy (Department of Defense [DoD], 2008b), the Quadrennial Defense Review (DoD, 2006), and the Capstone Concept for Joint Operations (DoD, 2009) all highlight a new focus by the DoD on knowledge in operations as opposed to traditional weapons platforms. As such, the military services have put KM programs in place to varying degrees. Each of these programs incorporates KM education albeit using different approaches with different outcome expectations. KM education and/or training has been recognized as critical to KM program success (Davenport & Prusak, 1998; Bassi, 1999; Jennex, 2006). Furthermore, research (KPMG Consulting, 2000; Keonig, 2004) indicates organizations that do not adequately address KM education are more likely to fail with KM efforts. Even so, there continues to be a sparsity of research with regard to KM education (Ruth et al, 2000; Grossman, 2007, Jain, 2009). The research that does exist concentrates primarily on curriculum development and content in higher education institutions (Ruth et al, 1999; Sutton, 2002; Chaudry & Higgins, 2003) leaving the exploration of organizational efforts to educate for KM, whether conducted internally or sourced from non-academic, professional organizations, a “black hole” of sorts. As such, this multiple-case study provides a first look at KM education within the U. S. Army, Navy, Marine Corps, and Air Force. The U.S. Coast Guard, although one of the five branches of the U.S. Armed Forces, was not included as they are under the jurisdiction of the Department of Homeland Security versus the Department of Defense. Informed by general principles concerning effective education programs and curriculum development (Glaser & Nitko, 1971; Lynton & Elman, 1987; Cervero, 1988; Light & Cox, 2001), the guiding research question was: *How are the military services of the DoD addressing KM education?* In order to conduct the inquiry, the following investigative questions were examined within the context of each military service:

- *What is the perceived importance of KM education?*

- *What is the specific nature of the programs in place to educate for KM?*
- *What are the goals and expected outcomes of KM education?*
- *What measures are used to evaluate KM education outcomes?*
- *What key issues have been encountered while trying to develop KM education programs?*

2. Literature Review

2.1. KM In The DoD

For over ten years the DoD has leveraged KM principles to improve information-sharing and support decision-making for warfighters (Office of the Assistant Secretary of Defense [OASD], 2000a; OASD, 2000b). The National Defense Strategy (DoD, 2008b), the Quadrennial Defense Review (DoD, 2006), the Capstone Concept for Joint Operations (DoD, 2009), and the DoD Information Enterprise Strategic Plan (DoD, 2010) are key military guidance documents that reflect both the growing importance of the "knowledge" resource as well as considerations that must be made to better exploit it. While recognizing the lack of a "centralized" DoD KM effort, the DoD Information Management/Information Technology Strategic Plan 2010 articulates the role of KM in enabling "effective and agile decision-making" and calls for the creation of a better "knowledge-sharing environment and application of knowledge-sharing concepts during the planning of joint experiments, operational concept development, combat operations and other missions" (DoD, 2008a, pg. 6). In light of the DoD-level KM objectives, each of the military services, have developed KM programs to varying extents--each include an education element. As recently as April 2009, DoD KM leaders convened and, among a number of KM goals, articulated the desire to increase KM education (Bordeaux, 2009).

2.2. KM Education

Holsapple and Joshi (1999) identified the lack of understanding and comprehension of the concept of KM as a cause for ineffective management of knowledge. KPMG (2000), in a study of more than 400 organizations, highlighted the "lack of user uptake due to insufficient communication" and "lack of training" as key reasons why the proposed benefits of KM systems failed to meet expectations. For organizations attempting to implement KM programs, it is widely acknowledged that KM education and/or training is an important element in making it happen. This idea is reflected in a variety of KM literature including the KM frameworks literature (e.g. Wiig, 1993; Stankosky, 2005) and the KM critical success factors literature (e.g. Davenport et al, 1998; Choi, 2000; Jennex & Olfman, 2000). For example, the KM framework offered by Wiig (1993) is comprised of three pillars: 1) exploring knowledge and its adequacy; 2) finding the value of knowledge; 3) managing knowledge actively. Each of these pillars rest on a foundation of a "broad understanding of knowledge". Wiig (1993) proposes that for an organization to have a "highly developed capability" (p. 22) in KM it must make a long-term investment in education and training. Stankosky's KM framework (2005) proposes four pillars--leadership, organization, technology, and learning. Similar to Wiig, Stankosky states, "KM must be given a priority position in our educational and training systems" (2005, p. 3). As for the critical success factors literature, Davenport et al (1998) identify that "clear purpose and language" (p. 51) with regards to KM is critical; a way to improve clarity and purpose can be via education. In Choi's (2000) investigation of 217 organizations, he found employee education to be one of the five critical factors with regard to KM implementation. Albeit with regard to knowledge management "system" success, Jennex and Olfman (2000) also find that "motivation and commitment of users include incentives and training" and "senior management support including…providing training" (p. 439). Overall, the literature indicates that organizations that address KM education stand to experience greater success in implementing KM.

2.3. Key Education Program Considerations

Implementing KM programs in organizations often requires significant organization change (Davenport & Prusak, 1998; Holt et al, 2007). One of the most effective tools in reducing cultural resistance to a new effort and institutionalizing change is through education (Lovelady, 1984; Mohrman et al, 1989).

The KM education programs, as they exist in the military services, can be characterized as professional continuing education programs. While Cervero (1988) highlights the lack of a “solid research base” on professional education program development, he offers specific strategies for doing so. Such strategies include a focus on administrative decision-making (Pennington & Green, 1976), a focus on strengthening professional performance (Houle, 1980; Nowlen, 1988), and a focus on “practice” and follow-up “audit” involving collaboration between higher education institutions and professional associations (Queeney & Smutz, 1990). Light and Cox (2001) offer that curriculum and course design considerations are also essential and should include: 1) good learning goals, objectives, or outcomes, 2) good curriculum materials and delivery methods for achieving those goals; and, 3) good tools for assessing whether and how those goals are achieved. Glaser & Nitko (1971) and Lynton and Elman (1987) both suggest that subject matter experts, with input from academia and practitioners, should design curriculum which assures that the curriculum provides the most relevant and accurate material. With regard to assessment, Anderson and Ball (1978) identify that collecting and analyzing data in the form of test scores, questionnaires, interview data, logs and diaries, observations, and ratings serve as effective evaluation mechanisms for most educational programs. Glaser and Nitko (1971) further add that such measurement provides an important feedback mechanism for continuing curriculum development and goal attainment assessment.

3. Methodology

This research used a case study approach as it is considered appropriate where few studies have been conducted (Benbasat et al., 1987). Furthermore, a multiple-case study design (Yin, 2003) was chosen as it could more easily illustrate complementary and contrasting KM education approaches. Each service was designated an individual case with the Navy and Marine Corps combined as a single case as the Marine Corps KM program is under the authority of the Navy Chief Information Officer (CIO) office. To allow for general comparisons between cases, service "KM education programs" was chosen to be the unit of analysis. As Yin (2003) describes, using multiple sources of evidence allows the development of “converging lines of inquiry” (p. 98) which can be used to convincingly and accurately answer research questions. As such, data collection consisted of interviews and document reviews. Interviews (11 total) were conducted with members of the organizations responsible for the services’ KM programs. Specifically, interviews for the Air Force were conducted with members of both the Warfighter Integration and CIO's KM office (known as SAF/XC) and the Air Force Center of Excellence for KM. Interviews for the Army and the Navy were conducted with members of each service's respective CIO's KM office. Each of these “offices” was responsible for service-wide oversight and implementation of KM. Data was also collected by reviewing KM education documents published by each service as well as doing a content analysis of related information available on each service's central "KM" portals--*Air Force Knowledge Now (AFKN), Army Knowledge Online (AKO), and Navy Knowledge Online (NKO)*. All data collected was entered into a case study database and pattern matching was used as the analysis method. In order to ensure design quality, construct validity, external validity, and reliability all were addressed in accordance with Yin (2003). In order to establish construct validity--to ensure that correct operational measures were employed--this research analyzed numerous documents from multiple sources that addressed service-wide KM and KM education initiatives. A strong chain of evidence supporting the conduct of the research was also established. Finally, only individuals responsible for service-wide KM and KM education initiatives were interviewed; respondents were given the interview questions in advance and were also allowed to review the draft case study report when finalized for additional clarification. In order to address external validity, the research involved investigation across three similar cases with the understanding that the military nature of the organizations might limit generalizability. Finally, with respect to designing for reliability, a robust case study database was developed that not only captured data but reflected, in detail, the conduct of the research itself.

4. Results

Data pertaining to each of the investigative questions will be presented the paragraphs that follow. Service-specific findings for each will be highlighted where possible.

4.1. What Is The Perceived Importance Of KM Education?

4.1.1. Air Force

Despite the lack of high-level leadership support for KM efforts as evidenced by the absence of service-wide policies, strategies, etc., in a 2004 memorandum to the Air Force Materiel Command (AFMC) Vice Commander, the Air Force CIO (SAF/XC) did delegate responsibility for service-wide Air Force KM efforts to the AFMC Center of Excellence for Knowledge Management. This Center of Excellence is often referred to as Air Force Knowledge Now (AFKN). AFKN provides (via a KM system also called AFKN) users with the resources to collaborate and create individualized communities of practice (CoP). The requirement to educate and train users on the capabilities and potential of AFKN CoPs has grown with the system's popularity and use. However, while AFKN personnel find KM education crucial to the KM system's success, they characterized users' perceived importance of KM education as minimal. AFKN personnel related in interviews that the majority of users were only interested in learning how to use the AFKN KM system tool and were not interested in learning about general KM principles. SAF/XC personnel, on the other hand, related in interviews that the importance of KM education was understood, and that they were hoping to develop courses for all AF personnel to be added to basic training and professional school education curricula at some point in the future. Overall, the investigation revealed conflicting views with regard to the perceived importance of KM education depending on the level of organization involved and the role KM played in the organization. Moreover, the difference between desires for general KM "education" versus "training" for the AFKN KM system were also highlighted.

4.1.2. Army

The Army has established a service-wide KM effort it calls Army Knowledge Management (AKM). While AKM serves only as a guide for Army KM efforts, the purpose is to develop a "network-centric, knowledge-based force" (Department of the Army [DoA], 2003). The AKM effort was initiated in 2001 by the Secretary and Chief of Staff of the Army. Additional AKM Guidance Memorandums published by the Secretary and Chief of Staff provide continued guidance for AKM efforts. AKM has five stated goals: 1) adopt governance and cultural changes to become a knowledge-based organization, 2) integrate KM and best business practices into Army processes to promote the knowledge-based force, 3) manage the infrastructure as an enterprise to enhance efficiencies and capabilities such as collaborative work, decision-making, and innovation, 4) institutionalize *Army/Defense Knowledge On-line* as the enterprise portal to provide universal and secure access for the entire Army , and 5) harness human capital for the knowledge-based organization (DoA, 2008c). Officially, the Army's KM education efforts are led by the CIO/G-6's KM and Human Capital divisions which published an Army-wide implementation plan back in 2003 (DoA, 2003). However, today, the Army has gone even further and appointed the Combined Arms Center (CAC) as the functional proponent for AKM; the CAC subsequently organized a directorate in the Knowledge Division (Battle Command Knowledge System [BCKS]) whose sole focus is supporting individuals and organizations applying KM. The Army also continues to publish updates to its KM regulations and guidelines to include the Army KM Regulation 25-1 (DoA, 2008b), Field Manual 6-01.1, *KM Section* (DoA, 2008a), and How the Army Runs (Chapter 16) KM (DoA, 2009). Overall, the data suggested a strongly perceived need for KM education as highlighted by two major actions: 1) formal delegation of KM education responsibilities to the CIO/G-6 office (which reports directly to the Chief of Staff of the Army) and the CAC; and 2) publishing a service-wide, authoritative documents with specific education actions and deadlines.

4.1.3. Navy/Marine Corps

In October 2005, the Department of the Navy (DON) CIO published a memorandum to communicate the Navy's KM strategy (DoN, 2005). This memorandum established a KM vision "to create, capture, share, and reuse knowledge to enable effective and agile decision-making, increase the efficiency of task accomplishment, and improve mission effectiveness". Interviews revealed that in order to realize this vision, a four-fold strategy was developed to: 1) broaden and expand Departmental awareness that KM concepts, when applied to the operational and business processes of any command, will enable significant improvements in mission accomplishment; 2) encourage commands to implement KM programs, structure, pilots, and methodologies as part of process improvement efforts; 3) assist commands with KM experience to share their experiences, lessons learned, and results to foster

collaboration, enable shortened learning cycles, and assist other efforts; and, 4) assist commands embarking on new implementations to build upon the experiences and resources of others. This memorandum further clarified seven focus areas in order to effectively implement this strategy that included KM advocacy, training and education, culture change, CoPs, KM collaboration, KM tools, and KM integration with related initiatives. The memorandum concluded by directing commanders to use KM concepts and tools to improve business and warfighting effectiveness, share KM best practices and resources, and continue to champion KM as a critical enabler of force transformation. The DoN CIO Campaign Plan 2010 (DoN, 2010a) also highlighted the continued importance of KM by specifically citing the need to improve information sharing and KM capabilities. The Campaign Plan 2010 specifically identifies the need to "develop follow-on strategies for KM" (p. 12) as well as provide assistance to Navy organizations in "applying KM tenants and implementing KM programs" (p. 12). Finally, the DoN Cyber/IT Workforce Strategic Plan FY 2010-2013 (DoN, 2010b), identifies KM (among others) as a "specific workforce role" (p. 4-5) and sets out specific goals and objectives that will allow the DON to "recruit, manage, develop, sustain, and retain" (p. 3) a qualified workforce. As a whole, this evidence suggested a strongly perceived need for KM education as highlighted by two major actions: 1) formal delegation of KM education responsibilities to the DON CIO office which reports directly to the Chief of Naval Operations; and 2) publishing service-wide, authoritative documents that include KM vision, strategy, focus areas, and specific KM education actions.

4.2. What Is The Specific Nature Of The Programs In Place To Educate For KM?

4.2.1. Air Force

The Air Force Center of Excellence for Knowledge Management staff tailors educational sessions for customers as requested. After educational sessions are completed, these same personnel work with desiring customers to establish CoPs. The sessions range from one-to-two hour KM overviews with live demonstrations of the AFKN tool to one to two-day immersion events which include in-depth instruction on concepts such as CoP knowledge owner roles and the dynamics community interaction. To date, KM education has been customer-specific, but AFKN personnel related in interviews that they are attempting to standardize KM education sessions and materials. Some of these educational materials have been developed and placed on the AFKN portal for access by interested users. Additional KM education products are offered via the IT e-Learning module on the main Air Force Portal. Ten of these e-learning courses mention "knowledge management" in the course description and/or course objectives.

4.2.2. Army

The Army has a robust KM education program that is delivered via a number of methods to include CIO/G-6 directed training, computer-based training support, Army Knowledge Leaders program, unit-level Knowledge Management Section personnel programs, web-based instruction, and resident KM courses. The Army CIO/G-6 office and CAC conduct programs to educate and establish a baseline understanding of KM among the Army Staff, functional communities, and the operational Army. The CIO/G-6 office has created an instructional DVD, "Foundations of Army Knowledge Management" (that can also be accessed on-line) which is divided into eight learning modules. The Army Knowledge (AK) Leaders program brings in top college business and IT major graduates for two years of intensive academic training, hands-on experience, and mentoring in IT management and leadership--a course on KM is part of this program. CAC also hosts a four-week KM Qualification course and a two-and-half day KM Application Course. Finally, the Army has published Field Manual 6-01.1, *KM Section,* (DoA, 2008a) that establishes the doctrinal principles, tactics, techniques, and procedures necessary to effectively integrate KM into the operations of brigades, divisions, and corps. This same document indicates that training and education for KM personnel "often occurs outside the unit in special courses…[or] in the unit, either by distributive learning or by training teams " (DoA, 2008a, pg. 2-6). At lower levels, Standard Operating Procedures address additional details with regard to implementing KM to include knowledge assessments, lessons learned, KM tool user guides, etc.

4.2.3. Navy/Marine Corps

KM in the Navy is focused on its two main postures: in-garrison and at sea. KM education for in-garrison applications is conducted primarily through DON CIO-directed KM education sessions. DON

CIO purports KM education as a critical component of the Navy's KM program and has absorbed all costs for the DON CIO-directed sessions. As such, multi-day sessions are conducted by DON CIO personnel upon request and focus on creating "awareness and understanding of the full spectrum of KM and how it can impact performance," within the context of the Navy enterprise, commands, communities, and individuals.

KM education for the Navy's at-sea posture is designed primarily to support carrier strike group Knowledge Officers (KO). Tactical Training Group Pacific (TTGP) conducts KM education sessions for KOs getting ready to deploy to sea, as well as, for carrier strike group admirals and staffs. TTGP sessions are developed by in-house personnel to ensure KOs can effectively fulfill their duties and to ensure carrier strike group leadership understands and encourages KM in support of KOs. Another at-sea KM education product is available through the Naval Postgraduate School (NPS). NPS KM courses include *Knowledge Superiority* and its prerequisite, *Defense Knowledge and Information Management*. Both courses are also available to all Navy personnel on-line and are available during regular schooling periods.

A final KM education product, available via Navy Knowledge On-Line (NKO), is a continuing education course titled, *Knowledge Distribution, Knowledge Flow, and Organizational Performance*. While KM education courses are mandatory for Navy Information Professionals, they are also available to any interested Navy personnel.

4.3. What Are The Goals And Expected Outcomes Of KM Education?

4.3.1. Air Force

As stated previously, the KM education offered to all AF employees is provided by the Air Force Center for Knowledge Management Excellence (AFKN) and via on-line training hosted on AFKN and the AF Portal. The content provided by AFKN ranges from educating on general KM theory and application to specific operation of the AFKN KM system. The specific topic matter of such sessions, as well as, the desired goals and outcomes are often tailored to user requests but were observed to fall into the categories of: 1) creating general KM awareness, 2) use of the AFKN KM system tool, or 3) the application of KM theory/practices for resolution of specific organizational problems. Similarly, the stated goals of the KM education products available through the AF Portal included: 1) introduce a new focus on performance improvement based on knowledge; 2) develop KM awareness; 3) initiate knowledge use, leverage, and application within organizations; and 4) support KM within organizations.

4.3.2. Army

Within the Army the primary organization for training and education is the Training and Doctrine Command (TRADOC). TRADOC has maintained a strong focus on KM within the BCKS division. With continued updates of its KM regulations (DoA, 2006) and the recent publication of its KM Strategic Plan (DoA, 2008c), it is expected that TRADOC KM education efforts will, among other objectives, help to: 1) focus on providing innovative working solutions and upgraded capabilities for actionable decision making, 2) leverage and capitalize on existing KM capabilities and grow them to meet future requirements, and 3) promote a collaborative culture throughout TRADOC and the Army to encourage knowledge sharing (DoA, 2008c).

With respect to the “Foundations of Army Knowledge Management" DVD, the specific expected outcomes are stated that, when complete, each viewer should be able to: 1) define KM in the Army context, 2) identify components of Army's knowledge-based goals, and 3) understand how every member of the Army plays a role in KM. There are numerous KM education modules within the BCKS site, each with their own objectives.

4.3.3. Navy/Marine Corps

The Navy provides four avenues for KM education—DON CIO-directed sessions, Tactical Training Group (TTGP) activities, Naval Post Graduate (NPS) courses, and an on-line continuing education unit offered via *Navy Knowledge Online*. The published desired outcomes of the DON CIO-directed sessions

are to help each attendee: 1) understand KM, 2) understand the differences between enterprise/command, community, and individual KM, 3) know which learning tools are available, 4) know where to locate supporting KM references and resources, and 5) possess the ability to apply KM to real-world problems. In contrast, the desired outcomes of the TTGP KM education activities are focused on ensuring that KOs can effectively fulfill their specific duties. An additional purpose is to ensure carrier strike group leadership understands and encourages KM in support of KOs. The desired outcomes for the NPS courses are that the learner: 1) understand how knowing relates knowledge to action, in the organizational environment, 2) comprehend the critical elements of KM, in the context of knowledge-flow theory, at the level of a knowledgeable professional, 3) analyze knowledge-work activities, in terms of knowledge-flow effectiveness, to identify the major strengths and weaknesses of an organization's KM program, 4) assess the effectiveness of an organization's KM program, and 5) formulate a KM program enhancement plan. Finally, the published outcomes of the NKO continuing educational unit course, *Knowledge Distribution, Knowledge Flow, and Organizational Performance* focus on helping the learner to: 1) identify benefits of KM, 2) understand different kinds of knowledge and how they add value to an organization, 3) understand why knowledge flows in some organizations and clumps in others, and 4) understand how to become a member of an appropriate community of practice (CoP).

4.4. What Measures Are Used To Evaluate KM Education Outcomes?

4.4.1. Air Force

The AF Center of Excellence for KM staff were found to use pre-and post-tests to measure participant learning in their tailored AFKN/KM training sessions. For those users who specifically requested AFKN KM system-related education/training, CoPs were also established and subsequent "use" statistics were gathered. These "use" statistics (e.g. website hits, documents stored, number of CoP members) were used indirectly to assess the effectiveness of the education/training. In contrast, it was found that KM education products available through the Air Force Portal and AFKN did not incorporate any form of assessment to evaluate participant learning.

4.4.2. Army

Many of the measures used by the Army focused on "aspects" of attendance. Numbers of those who viewed the "Foundations of Army Knowledge Management" module (DVD or on-line) were tracked. Attendance was taken at CIO/G-6-directed educational sessions. For the resident courses offered by BCKS, mastery of the hands-on objectives was evaluated through testing. The BCKS directorate was also found to have an assessment team on staff that assists organizations in assessing KM processes, to include KM education. The assessment protocol includes identifying individual and organizational knowledge gaps. As evidence of the focus on measuring outcomes, BCKS recently published an article, *Trends in Knowledge Assessments* (McGurn*,* 2010) in the online journal, *Connected.*

4.4.3. Navy/Marine Corps

The Navy/Marine Corps was found to use a combination of outcome assessment approaches. Attendance was taken at the DON CIO-directed educational sessions. In contrast, TTGP was found to use end-of-course surveys to evaluate education material quality and participant learning. It was also found that TTGP conducted interviews with carrier strike group leadership and KOs after they returned from deployments to assess perceptions of KO effectiveness in performance of KM duties as well as assessment of leadership support of KM and KOs. For the NPS-offered courses, end-of-course student surveys and tests were used to assess participant learning. Finally, for the course offered via NKO, participants are required to take a pre-test as well as a post-test on the materials presented.

4.5. What Key Issues Have Been Encountered While Trying To Develop KM Education Programs?

4.5.1. Air Force

Senior leadership support for KM in the Air Force and AFKN remains a challenge. Interviews revealed this may be due to a general lack of KM understanding among senior leaders. This lack of leadership support has translated into few expectations for growth in KM education programs and a lack of funding support for existing ones. The Air Force Center of Excellence for KM staff, for instance, has fielded the AFKN KM system with limited funding and with in-house development only. This has lead to a lack of "bells and whistles" seen on other commercial KM/collaboration systems. Finally, where there has been mention by KM proponents in the CIO's office regarding inclusion of KM education into professional military education (PME) courses as a way to expand KM education across the service, there has been a great deal of "push-back".

4.5.2. Army

Army leadership and culture is extremely supportive of KM and KM education. The robust nature of its KM education opportunities is a testament to that support. Despite the significant progress in developing KM education opportunities, procuring funding to create new and maintain old KM education products and offerings, given the many other competing resource demands, continues to be a challenge.

4.5.3. Navy/Marine Corps

Navy/Marine Corps leadership is also very supportive of KM and KM education. One of the DON CIO's top goals has been to incorporate KM education into PME courses. DON CIO staff stated they were working to justify the benefits of doing so and were hoping to make this addition in the coming years. As was found in other services, the TTGP KM education efforts are also impacted by funding support issues due to competing demands. Another unique issue involves the difficulty in channeling KOs through TTGP KM educational sessions before they head to sea. Scheduling is often complicated with some KOs never receiving KM education/training before reporting to their KM duty assignment. TTGP personnel reported that KOs who receive KM education/training before reporting for their sea-based assignments are much more successful in their duties.

5. Summarizing

Given the responses to the numerous investigative questions, it is obvious that an assessment of KM education as it exists across the U.S. military services is a complex matter. Analysis reveals that there are similarities as well as differences, positives as well as negatives, challenges as well as successes. As such, a summary of responses to the investigative questions is offered in Table 1 below.

	Air Force	Army	Navy/Marine Corps
Perceived Importance	-Conflicting findings -No published support from service leaders but importance acknowledged -KM practitioners desire KM system "training" but little KM "education"	-Perceived important by service leaders and KM practitioners -Publications/strategy reveals hard evidence	-Perceived important by service leaders and KM practitioners -Publications/strategy reveals hard evidence
Nature of Programs	-AFKN KM system education/training -AFKN user-tailored education -KM module offered via IT E-Learning on AF Portal	-Robust KM edu/trng pgm -BCKS website/training products -CIO/G-6- directed sessions -Field Manual guidance for all KM personnel	-DON CIO-directed sessions -TTGP sessions -NPS courses -NKO courses
Goals and Expected Outcomes	-Familiarization w/key concepts of KM -Develop better users of	-Development of workforce -Familiarization w/key	-Development of workforce -Familiarization w/key

	AFKN KM system	concepts of KM -Applying KM in the workplace	concepts of KM -Applying KM in the workplace -Preparing KOs for KM duties
Outcome Evaluation Measures	-AFKN user-tailored sessions—pre/post testing -AFKN KM system sessions—collect "use" statistics	-Tracked # of viewers of "Foundations" DVD & on-line module -Attendance taken for CIO/G-6 sessions -BCKS organizational assessment team	- Attendance taken for DON-led sessions -TTGP uses end-of-course surveys/interviews -NPS uses end-of-course surveys/tests -NKO module requires pre/post test
Program Development Issues	-Senior leadership support -Adding KM to PME courses -Funding	- Funding	-Adding KM to PME courses -KM education prior to at-sea assignment rotations -Funding

Table 1: Summary Of DoD KM Education Findings

6. Discussion

Overall, the results indicate that the military services place varying degrees of importance "on" and undertake different approaches "to" KM education. The Army and Navy have demonstrated the greatest commitment from senior leadership levels—through strategy and action—to KM education. The Army and Navy CIOs have established "top-down" KM education goals and program direction which have been published in service-wide directives, allowing the CIOs to "push" KM and KM education throughout their service. The Army has specifically provided service-wide KM education goals within the AKM strategy while the Navy has done so via the Campaign Plan 2010 & Cyber/IT Workforce Strategic Plan FY2010-2013. These same services are also encouraging and adding structure, as appropriate, to lower-level KM education initiatives. The Air Force CIO, however, has delegated primary responsibility for KM and KM education to an organization situated hierarchically in a subordinate command and activity unrelated to the CIO function. As such, the Air Force appears to have undertaken a "bottom up" approach to KM education whereby Air Force personnel are limited to "pulling" KM education from on-line KM education products and AFKN-offered training sessions.

As for expected outcomes, it was learned that, although the nature of the KM education programs differ somewhat, the expected outcomes are in many ways similar. All services desired familiarization of the key concepts of KM. However, while the Air Force desires to develop better users of its AFKN KM system, the Army and Navy both are working to see KM applied at all levels of the service.

Also, all services used traditional outcome measures such as pre/post testing, website hits, attendance, and end-of-course surveys. It is not uncommon in KM research, and even information technology research, to use proxy measures for evaluating KM effectiveness given its complex nature. While researchers have developed models to more accurately measure KM effectiveness (Jennex, 2006), only the Army has attempted to adopt more complex measures to evaluate the effectiveness of KM and KM education.

Finally, with regard to the Army and Navy, overarching service-wide goals backed by strong senior leadership support appear to have resulted in greater resource (money, people, and time) commitment to KM education. The broad range of Army and Navy KM education offerings allow the services to provide KM education to personnel with varying degrees of understanding and ability, thereby increasing the total number of personnel that are educated about KM. All services, however, reported funding issues as obstacles in implementing complete KM education programs. This is not surprising given the expense of modern weapon systems and the sheer volume of current military operations.

7. Implications For Practice And Theory

The implications of this research with regard to practice indicate that there are many ways to approach KM education depending on mission/business goals, leadership support, and resource availability. The Army provides a good example of a robust KM education program, followed by the Navy/Marine Corps. What is obvious across all the cases, however, is that strong leadership support is a critical ingredient to success. With strong leadership, KM education can be better inculcated into the service and resource commitment issues can be mitigated as well. It was also observed that "one size fits all" KM education is not possible or desirable in large enterprises such as the military services. Although "general KM awareness" education was seen as important across the board, it was also seen as necessary to educate for KM application in the workplace. The services also appear to have similar issues with "outcome measurement" as is reported in the literature. As Jennex (2006) states with regard to KM or KM system success, "researchers are finding it difficult to quantify results" (p. 429-430). Only a few KM education/training offerings attempt to assess "learning" as opposed to "exposure." Finally, and ironically, it appears the services could benefit from some "KM with regard to KM." Other than a few rare instances, such as a joint trainers' workshop held in October 2008 (Anonymous, 2010), it was found that the services were not collaborating on KM much less KM education. Given that all of the services belong to the DoD and that "joint operations" have become the standard, it would seem that collaboration across the services to provide, at least, general KM education could facilitate consistency in "message and approach", promote resource savings, and provide additional impetus for knowledge-sharing across service stovepipes rather than within them.

Finally, the implications for theory involve an addition to the body of research concerning KM education--this research being the first look at KM education in the military services. More specifically, it adds support to the existing research that discusses the importance of KM education and the nature of KM education programs, as well as illustrates how leadership support and resource barriers to execution parallel those encountered in developing KM programs in general.

8. References

Anderson, S. B. and Ball, S. (1978). *The Profession and Practice of Program Evaluation*. San Francisco, CA: Jossey-Bass

Anonymous. (2010). Jointness in KM Training - a Way Ahead. *Connected,* Fall, 2008. Retrieved August 25, 2010 from http://usacac.army.mil/cac2/bcks/Connected/Connected-Fall2008.pdf

Bassi, L.J. (1999). *Measuring Knowledge Management Effectiveness*. In J. W. Cortada and J. A. Woods (Eds.), *The Knowledge Management Yearbook 1999-2000* (pp. 422-427). Boston, MA: Butterworth-Heinemann.

Benbasat, I., Goldstein, D. K., and Mead, M. (1987). The Case Research Strategy in Studies of Information Systems. *MIS Quarterly, (11)3*, 368-386.

Bordeaux, J. (2009). The Day DoD KM Died. Retrieved August 4, 2010, from http://jbordeaux.com/the-day-dod-km-died/

Cervero, R. M. (1988). *Effective Continuing Education for Professionals*. San Francisco, CA: Jossey-Bass Publishers.

Chaudry, A. S. and Higgins, S. E. (2003). On the need for a multidisciplinary approach to education for knowledge management. *Library Review, 52(2),* 65-69.

Choi, Y. S. (2000), *An Empirical Study of Factors Affecting Successful Implementation of Knowledge Management*. Unpublished Doctoral Dissertation, University of Nebraska, Lincoln.

Davenport, T. H., De Long, D. W., and Beers, M. C. (1998). Successful Knowledge Management Projects. *Sloan Management Review, 39 (2)*, 43-57.

Davenport, T. H. and Prusak, L. (1998). *Working Knowledge: How Organizations Manage What They Know.* Boston, MA: Harvard Business School Press.

Department of the Army (2003). *Army Knowledge Management Implementation Plan.* 1 September 2003. Retrieved August 13, 2010 from http://usacac.army.mil/cac2/BCKS/ArmyKMImplementationPlan.pdf

Department of the Army (2006). *TRADOC Regulation 25-1, Information Management, 16 September 2006*, Headquarters Training and Doctrine Command, Ft. Leavenworth, KS. Retrieved from http://www.tradoc.army.mil/tpubs/regs/r25-1.pdf

Department of the Army. (2008a). *Army Field Manual Instruction No. 6-01.1, Knowledge Management Section, 29 August 2008*. Retrieved August 3, 2010 from https://rdl.train.army.mil/soldierPortal/atia/adlsc/view/public/24845-1/FM/6-01.1/FM6_01X1.PDF

Department of the Army, (2008b). *Army Regulation 25-1, Army Knowledge Management and Information Technology, 4 December 2008*. Retrieved August 13, 2010 from http://www.army.mil/usapa/epubs/25_Series_Collection_1.html

Department of the Army (2008c). *TRADOC Knowledge Management Strategic Plan v.6, 2 December 2008*. Headquarters Training and Doctrine Command, Ft. Leavenworth, KS. Retrieved August 14, 2010 from https://www.us.army.mil/suite/doc/20370709

Department of the Army (2009). *How the Army Runs, Chapter 16, Army Knowledge Management,* US Army War College, Ft. Leavenworth, KS. Retrieved August 14, 2010 from http://www.carlisle.army.mil/usawc/dclm/htar2009.pdf

Department of Defense (2006), *Quadrennial Defense Review Report*, Secretary of Defense, Washington, D.C.. Retrieved August 3, 2010 from http://www.defense.gov/qdr/report/Report20060203.pdf

Department of Defense (2008a). *Information Management/ Information Technology (IM/IT) Strategic Plan 2008-2009*. Chief Information Officer, Washington, D. C.. Retrieved August 3, 2010 from http://cio-ii.defense.gov/docs/DoDCIO_Strat_Plan.pdf

Department of Defense (2008b), *National Defense Strategy*, Joint Chiefs of Staff, Washington, D. C.. Retrieved August 3, 2010 from http://www.defense.gov/news/2008%20national%20defense%20strategy.pdf

Department of Defense (2009), *Capstone Concept for Joint Operations*, Joint Chiefs of Staff, Washington, D. C.. Retrieved August 3, 2010 from http://tinyurl.com/http-capstoneconcept2009

Department of Defense (2010). *Information Enterprise Strategic Plan 2010-2012*. Assistant

Secretary of Defense (Networks and Information Integration)/Department of Defense Chief Information Officer, Washington, D. C.. Retrieved August 3, 2010 from http://cio-nii.defense.gov/docs/DodIESP-r16.pdf

Department of the Navy (2005). Memorandum: Department of the Navy Knowledge Management Strategy. DON CIO. Washington, D. C. Retrieved August 15, 2010 from http://www.doncio.navy.mil/PolicyView.aspx?ID=424

Department of the Navy (2010a). Department of the Navy Chief Information Officer Campaign Plan 2010. DON CIO. Washington, D. C. Retrieved August 15, 2010 from http://www.doncio.navy.mil/Products.aspx?ID=1356

Department of the Navy (2010b). Department of the Navy Cyber/IT Workforce Strategic Plan FY2010-2013. DON CIO. Washington, D. C. Retrieved August 15, 2010 from http://www.doncio.navy.mil/Products.aspx?ID=1839

Glaser, R. and Nitko, A. J. (1971). Measurement in Learning and Instruction. In R.L. Thorndike (Ed.), *Educational Measurement (2nd ed.)* (pp. 625-670). Washington, D.C.: American Council on Education.

Grossman, M. (2007). The Emerging Discipline of Knowledge Management. *Journal of Information Systems Education, 18(1*), 31-38.

Holsapple, C. W. and Joshi, K.D. (1999). Description and Analysis of Existing Knowledge Management Frameworks. *Proceedings of the 32nd Hawaii Conference on Information System Sciences, Maui, HI.*

Holt, D. T., Bartczak, S. E., Clark, S. W., & Trent, M. R. (2007). The Development of an Instrument to Measure Readiness for Knowledge Management. *Knowledge Management Research and Practice*, 5(2), 75-92.

Houle, C. O. (1980). *Continuing Learning in the Professions*. San Francisco, CA: Jossey-Bass Publishers.

Jain, P. (2009). Knowledge Management for 21st Century Information Professionals. *Journal of Knowledge Management Practice*, 10(2), 1-11.

Jennex, M.E. and Olfman, L. (2000). Development recommendations for knowledge management/organizational memory systems. *Proceedings of the Information Systems Development Conference 2000*.

Jennex, M. E. (2006). Knowledge Management System Success Factors. In D. Schwartz (Ed.), *Encyclopedia of Knowledge Management* (pp. 429-435). Hershey, PA: Idea Group Reference.

Koenig, M.E. (2004). Knowledge Management and User Education: The Unrecognized Achilles' Heel. In M.E. Koenig & T.K. Srikantaiah (Eds.), *Knowledge Management Lessons Learned: What Works and What Doesn't*. (pp. 487-496). Medford, NJ: Information Today.

KPMG Consulting (2000), *Knowledge Management Research Report*, New York, NY.

Light, G. and Cox, R. (2001), *Learning and Teaching in Higher Education: the Reflective Professional*. Thousand Oaks, CA: Sage Publications.

Lovelady, L. (1984). Change Strategies and the Use of OD Consultants to Facilitate Change: Part I. *Leadership and Organizational Development Journal*, (5), 3-5.

Lynton, E.A. and Elman, S.E. (1987). *New Priorities for the University: Meeting Society's Needs for Applied Knowledge and Competent Individuals*. San Francisco, CA: Jossey-Bass.

McGurn, L. (2010). Trends in Knowledge Assessments. *Connected,* Winter 2010. Retrieved August 14, 2010 from http://usacac.army.mil/cac2/bcks/Newsletter.asp

Mohrman, S.A., Mohrman, A.M., Jr. and Ledford, G.E., Jr. (1989). *Large Scale Organizational Change*. San Francisco, CA: Jossey-Bass.

Nowlen, P. M. (1988). *A New Approach to Continuing Education for Business and the Professions: The Performance Model*. New York, NY: MacMillan.

Office of the Assistant Secretary of Defense/C3I. (2000a). *Information Superiority and the Future of DoD*. Retrieved August 4, 2010, from http://www.dodccrp.org/files/Alberts_Information_Superiority.pdf

Office of the Assistant Secretary of Defense/C3I. (2000b). *Information Superiority Making the Joint Vision Happen*. Retrieved August 4, 2010, from http://www.dodccrp.org/files/joint_vision/JVCover.html

Pennington, F. C. and Green, J. (1976). Comparative Analysis of Development Processes in Six Professions. *Adult Education, (27)*, 13-23.

Queeney, D. S. and Smutz, W. D. (1990). Enhancing the performance of professionals: the practice-audit model. In Willis S. L., Dubin, S. S. (Eds.), *Maintaining professional competence approaches to career enhancement, vitality, and success throughout a work life* (pp.162-163). San Francisco, CA: Jossey-Bass Publishers.

Ruth, S. Theobald, J., and Frizzel V. (1999). University-based Approach to the Diffusion of Knowledge Management Concepts and Practices. *Proceedings of the SIGCPR '99. New Orleans, LA.* pp. 283-290.

Ruth, S., Shaw, N., and Frizzell, V. (2000). Knowledge Management Education: An Overview of Programs of Instruction. In C.W. Holsapple (Ed.), *Handbook on Knowledge Management* (pp. 581-603). New York, NY: Springer-Verlag.

Stankosky, M. (2005). Advances in Knowledge Management: University Research Toward an Academic Discipline. In M. Stankosky (Ed.), Creating the Discipline of Knowledge Management (pp.1-14). Boston, MA: Elsevier Inc.

Sutton, M. J. (2002). A Topical Review of Knowledge Management Curriculum Programs in University Graduate Schools: Library and Information Science, Cognitive Science, Information Systems and Computer Systems Schools. *Proceedings of the First Annual Knowledge Summit Doctoral Consortium, Queen's Univ., Kingston, Ontario*. pp. 1-37.

Wiig, K. (1993). *Knowledge Management Foundations*. Arlington, TX: Schema Press.

Yin, R.K. (2003), *Case Study Research: Design and Methods (3rd ed.)*. Thousand Oaks, CA: Sage Publications.

Contact the Authors:

Summer E. Bartczak, Lt Col, (*USAF Retired*), University of Central Arkansas, 201 Donaghey Ave., Conway, Arkansas 72035; Email: sbartczak@uca.edu

Gary L. Wright, Capt, USAF, Air Force Operational Test & Evaluation Center, Kirtland AFB, NM; Email: gary.wright@afotec.af.mil

Todd A. Peachey, Lt Col, USAF, Air Force Institute of Technology, Wright-Patterson AFB, OH 45431; Email: todd.peachey@afit.edu

James P. Downey, Cmdr, (*USN Retired*), University of Central Arkansas, 201 Donaghey Ave., Conway, Arkansas 72035: Email: jdowney@uca.edu

Kaye McKinzie, LTC, *(USA Retired),* University of Central Arkansas, 201 Donaghey Ave., Conway, Arkansas 72035; Email: kmckinzie@uca.edu

---