Combat Librarian: Knowledge Management and Social Informatics at the End of the Iraq War, a Case Study

Caryn L. Anderson

University of Illinois at Urbana-Champaign,
Graduate School of Library and Information Science, Champaign, IL, USA
CLndrsn2@illinois.edu, Caryn.Anderson@gmail.com

Abstract. Organizations operating in complex, dynamic, and frequently changing environments have a vested interest in making sure that knowledge created today is available for use tomorrow. This paper describes a case study of knowledge management (KM) in the U.S. Government at the end of the Iraq war, where the breadth and depth of relevant knowledge was extreme. KM activities are analyzed using Anderson's KM and Kling's social informatics frameworks. The results reveal that many of the challenges encountered mirror the socio-technical interdependencies identified in other organizational settings, which suggests that lessons learned from this extreme case can be used to inform KM practices of information professionals in non-combat environments.

Keywords: Knowledge management * government information * socio-technical factors * social informatics * war

1 INTRODUCTION

The "Iraq Knowledge Management (KM) Transition," a joint Department of State (DOS) and Department of Defense (DOD) effort, ensured that the intelligence, relationships, capacity building, and reconstruction developed by the United States Government (USG) over eight years in Iraq could continue to be leveraged by the U.S. diplomatic mission after the departure of the U.S. military in December 2011.

At the peak of coalition military operations in Iraq, in 2008, the United States Government (USG) operated roughly 500 military bases and embassy locations, including Provincial Reconstruction Teams (PRTs), in all 18 Iraqi provinces. In 2008, the USG employed an estimated 320,000+ soldiers, diplomats, U.S. civilian government staff, and contracted personnel in Iraq [1,2][1]. In addition to military operations and diplomatic relations, the USG was executing

[1] Total USG personnel numbers are extremely difficult to find or calculate. 2008 troop levels are estimated at 157K in a 2009 Congressional Research Service report [1]. This author's experience managing contractor numbers in Iraq and Afghanistan suggests a 1:1 ratio with troop levels. Diplomats are estimated at another 8K+ based on author experience managing diplomat and agency personnel numbers during the transition and a 2014 Washington Post article [2]. The 320,000+ estimate is conservative.

reconstruction and development programs in almost every sector of society in every province of Iraq.

The draw-down of military forces, in accordance with the Status of Forces Agreement (SOFA) signed by the U.S. and Iraq in 2008, and the transfer of activities and responsibilities from DOD to DOS and the Government of Iraq (GOI) between 2010 and 2011 became known as "the Transition." An audit of all DOD activities resulted in a list of over 700 substantial operations to be transferred either to the GOI or to DOS [3]. DOS and DOD established an interagency committee, supervised by a Knowledge Management Coordinator (this author) to effect a comprehensive transition of interagency knowledge during the closure of 12 PRTs, the transformation of four PRTs to consulates, and the departure of United States Forces-Iraq (USF-I) from 74 bases within 12 months. KM became one of 13 "lines of transition" tracked bi-weekly by the Executive Core Group, a committee comprised of the most senior USG military and diplomatic leadership in Iraq [3]. (see Appendix 6.1 for acronyms list)

2 METHODS

2.1 KM Transition Data

The author was the Knowledge Management Coordinator and the only full-time staff member dedicated to the Iraq KM Transition until late 2011. Findings here are based on her involvement with every aspect of the effort including the initial information audit, the development of criteria and processes for transitioning[2] information, the monitoring and adjustment of tactics, and the deliverables. The most significant deliverable was the KM Directory. The KM Directory indicated the location of all transitioned knowledge and applications, indexed and cross-referenced by a variety of topical themes (e.g., geography, sector, knowledge type, network location) to assist enduring staff in locating and using the relevant knowledge. Other deliverables included new software, tools for streamlining security, refugee, and contractor processes, and briefs synthesizing eight years of knowledge in multiple sectors of Iraq society.

The initial KM audit identified 482 information sources and 46 software applications to transition. The Iraq KM Transition was not undertaken as a research study with an academic IRB protocol. The results described here are based on conversations with hundreds of individuals in over 80 units from dozens of USG departments and agencies[3] in private interviews, conferences, workshops, small group seminars, and hundreds of transition-related committee meetings. The process was documented in briefs to the Executive Core Group every two months, to General Lloyd J. Austin, III and Ambassador James F. Jeffrey three times each, and cable #12 BAGHDAD 1910.

2.2 Performance Factors and Military Strategy

The author's service in Iraq began in 2009 as an Information Resource Officer responsible for DOS programs to strengthen libraries in Iraq. Colleagues began referring to her as the "Combat

[2] The verb "transition" was used to encompass movement of files, extractions, or synthesis/summary reports; submission of descriptions of knowledge with directions on how to access it where it lived; and modification and updated contracts for software applications.

[3] Many USG departments and agencies were represented in Iraq (e.g., Departments of Agriculture, Commerce, Defense, Energy, Homeland Security, Justice, State, Transportation, Treasury; Bureau of Alcohol, Tobacco and Firearms, Federal Bureau of Investigation)

Librarian." As Knowledge Management Coordinator (2010-2012), the moniker held true as much for the daily battles to engage people in KM tasks as for the danger she faced traveling to dozens of sites.

As her military colleagues liked to say, "No plan survives first contact with the enemy." The KM Transition was no exception. The KM team had no authority to demand action and executed a series of "sorties" where they tried multiple tactics on a unit or key individual to motivate their action to preserve critical knowledge. A useful explanatory tool has been the energy-maneuverability equation of the great military strategist COL John R. Boyd: Ps=[T-D/W]*V (Performance = Thrust - Drag / Weight x Velocity) [4]. Developed for the performance of aircraft, Boyd's formula maps easily to the relationships of key factors affecting the performance of the KM Transition. The KM team's available human resources (Thrust) were limited and mostly fixed[4]. The social-technical obstacles related to human behavior, personality, politics, and policies (Drag) were the factor most amenable to influence or workarounds. Bureaucratic and time obstacles (Weight) were substantial and grew "heavier" as the transition progressed. The forward momentum of the KM Transition (Velocity) increased over time, but very slowly in the beginning.

The KM team was constantly re-evaluating the process and modifying strategies in the factors they could influence. These activities align with another of Boyd's theories, built on military strategist Sun Tzu (6th century BC), known as the "OODA" loop. The team was constantly observing (O) how the "battleground" was changing, re-orienting (O) themselves based on the new data and its context, making complex decisions (D) to adjust tactics and re-configure the tools ("weapons") they used, and taking action (A) to influence their colleagues ("opponents") [5].

2.3 Frameworks

Analysis frameworks from knowledge management and social informatics were used to contextualize this case study. A previous synthesis by Dalkir of KM theorists and practitioners [6] was distilled by Anderson into its most basic framework: "In short, effective knowledge management can only be conducted in a customised way… Nevertheless, it is possible to synthesise key components of knowledge management approaches into four integrated and interdependent dimensions: types of knowledge (tacit and explicit); phases of the knowledge management cycle (capture and/or creation, sharing and dissemination, acquisition and application); components of approach (theories, content, tools, people, processes); and levels of actors (individual, group or community, organisation as a whole)." [7]

Characterizations of social informatics provided a second approach, which focused on socio-technical factors in information and communications technologies (ICTs). Kling, Rosenbaum and Sawyer, recognized leaders in the study of the effects of human contexts on the implementation of ICTs (social informatics), developed a framework for understanding the social, technical, and institutional nature of ICTs using conclusions drawn from their extensive research (Table 1) [8].

[4] 1.5 FTE Oct. 2010-Sep. 2011; 2.5 FTE Sep. 2011-Nov. 2011; 2.25 FTE Dec. 2011-Jul.2012

Table 1. "Social, Technical and Institutional Nature of ICTs" [8] ([Bracketed numbers] indicate codes used in analysis.)

Social Nature of ICTs	*Technical Nature of ICTs*	*Institutional Nature of ICTs*
[S1] ICTs are interpreted and used in different ways by different people	[T1] ICTs have both communicative and computational roles	[I1] ICTs social and technical con-sequences are embedded in institutional contexts
[S2] ICTs enable and constrain social actions and social relationships	[T2] ICTs have temporal and spatial consequences	
[S3] ICTs provide a means to alter existing control structures	[T3] ICTs rarely cause social transformations	[I2] ICTs often have important political consequences
[S4] ICTs can lead to negative consequences for some stakeholders	[T4] ICTs are not magic bullets: they do not solve things by themselves	

This social informatics (SI) analysis tool was integrated with Anderson's KM framework to describe the complexities of the Iraq KM Transition. Each specific SI characteristic was given a code. For each KM dimension, if one or more examples of SI issues influencing the KM Transition were identified, the relevant SI code was assigned to that KM dimension. Subcategories of SI issues were refined iteratively.

3 RESULTS

The analysis of the Iraq KM Transition using the two frameworks revealed a high volume of social-technical challenges affecting most KM dimensions. The descriptions of KM dimensions, subcategories, and SI codes that follow includes examples from the KM Transition to outline the types of challenges identified.

3.1 Types of Knowledge

Tacit.

Hidden: Lots of knowledge in people's heads [T1, T2]. The KM Transition began with a concern about the maintenance of Iraqi contacts. 74 USG locations throughout Iraq's 18 provinces were narrowing to 12. As details for these contacts were transitioned to ensure access from the enduring USG locations, tacit knowledge from staff needed to be recorded along with phone numbers and titles. A note in a contact record indicating that he often represented themselves falsely, would save time [T2] and effort if he requested a meeting with the Ambassador. When necessary to engage with an official in a remote province [T2], knowing to contact the assistant instead would not only expedite matters [T1, T2] but support a reputation among locals that USG operations were coordinated. Departing staff were also instructed to translate their tacit knowledge by ranking the significance of their contacts [T1] as 1-critical contact, maintain ongoing relations; 2-important but not critical; or 3-prior engagement, but not significant (e.g., participation in a USG sponsored program)).

Unknown: Many didn't know what they knew [S1]. As with most situations, combat or otherwise, individuals often didn't realize the tacit knowledge they possessed. The KM Coordinator met with all staff departments of the "J"oint (Army, Navy, Air Force, Marines) military teams of U.S.

Forces – Iraq (USF-I). Logistics (J4) was the staff department responsible for managing materiel, transport, services, facilities, and medical/health support. When meeting with the J4 general and his staff, the general was convinced that his activities and relevant knowledge were specifically focused on military logistics and were therefore of no value to the Department of State [S1]. The KM Coordinator pressed on, "What are you most afraid of happening here after you leave?" "The State Department has no idea what they are doing. They don't know the first thing about moving food and fuel around this country." "What should they do?" "Hire a retired Army Logistics officer." "What kinds of skills and experience would be necessary in such an officer?" The general went on to list a variety of detailed requirements. Discussion expanded quickly and concluded with the general directing his staff work with the KM team on developing a job description for the kind of consultant DOS needed. The crafting of this job description elicited an extensive amount of knowledge, both tacit and explicit, that would otherwise have been unavailable to the enduring U.S. mission [S1].

Sharing: Bringing people together to exchange knowledge built new relationships [S1, S2, T1, I2]. Theater-wide[5] conferences (two in 2011, 80+ USG units represented) and small-group seminars (intelligence, security, human terrain systems, public affairs) were convened to validate the enduring need for different types of knowledge and to ensure that no knowledge was falling through the cracks. What emerged was an explosion of camaraderie and information sharing as groups and individuals previously isolated from each other by location [T2], network [S2, T2], or timing [T2] realized they had information that would be useful to each other. For example, military units who had gathered intelligence locally, like human rights violations, discovered that the knowledge would be useful [S1, T1] to DOS Political (POL) or International Narcotics and Law Enforcement (INL) officers in determining eligibility for training programs[6] [I2] or Public Affairs Section (PAS) officers in restricting such candidates from exchange programs involving visits to the U.S. [I2]

Explicit.

Interoperability: Different network platforms complicated data collection [T1, T2, I1]. Most USG agencies and departments working in Iraq used one or more networks exclusive to their department [T2][7]. Transferring documents between networks was extremely difficult for security reasons and inhibited the ability to share relevant information in a timely manner [T1, T2, I1]. This was just one of the reasons why the KM Transition decided to store relevant knowledge in the networks where it originated and develop a KM directory that would direct users to where the knowledge was held, advising what permissions and clearances were required to access it.

Inequality: Unequal data value and labeling prohibited automation [S1, S4, T1, T2, I1]. Many employees asked why a technical tool couldn't be developed to import all their unit's files into a repository [S1]. Technical reasons why this wouldn't work are discussed later. Even if this were possible, the unit network drives and data repositories contained huge amounts of data and information that were not of equal value to the enduring mission. For example, the network drive

---

5 Attendees came from Iraq and DOD Central Command (CENTCOM) in Kuwait and Qatar.

6 The Leahy Law prohibits individuals with known human rights violations from participating in U.S. sponsored security-related training programs (e.g., counter-narcotics training).

7 DOD: NIPRNet (unclassified), SIPRNet (classified); DOS: OpenNet (unclassified), ClassNet (classified); USAID: AIDNet. Other smaller agencies had private networks also.

of a given PRT or military office usually contained multiple drafts of documents, photos from office events, travel requests, and abandoned files of unfinished projects. It would be virtually impossible for a future employee to adequately identify useful knowledge quickly. Complicating matters, each unit organized their knowledge differently. Some organized by project or by some date-related theme. Some organized by sector of Iraqi society or by unit subdivisions [T2]. Most had an inconsistent combination of these different schemes. Even individuals within a unit frequently labeled their files and folders differently, with an astounding number of folders titled some equivalent of "Joe's Stuff." Mapping these systems to create an automated process to produce useable knowledge would have taken years [S4, T1, T2].

Classification: Secret and other inhibited process [I1, I2]. The rules for keeping USG information of different classifications separated are very clear and very strict. There were parallel KM strategies for transitioning knowledge for unclassified, secret, top secret and top secret/sensitized compartmented information (TS/SCI). This created two types of challenges. The computer networks of the four different military divisions operating in Iraq were not connected to each other. To transition data to an enduring network, extensive authorizations were required to download material (especially classified) onto secure portable drives, courier it with cleared personnel, and upload it onto the receiving network [I1, I2]. The second challenge was that DOD mostly operated on their classified network (SIPR) and a great amount of unclassified work became classified by default. DOS mostly operated on their unclassified network (OpenNet). The process of de-classifying unclassified information from the DOD network for DOS use was extremely onerous and political, so unclassified DOD knowledge remained in the classified realm, with notes in the KM Directory [I1, I2].

3.2 Knowledge Cycle

Capture and/or creation.

Personality & Politics: Choices to participate were motivated by self-interest [S1, S3, S4, T2, I1, I2]. The KM Transition had no real mandate to require units to participate in assessing and transitioning relevant knowledge. DOS issued Staff Notices and DOD issued Fragmentary Orders (FRAGOs) directing staff to participate, but there were no consequences for non-participation. Individuals were variable in their cooperation. Those who felt a personal investment in the long-term USG mission, the fate of Iraq, and their own job contributed most fully [S1]. Other individuals were resistant because of the amount of work [S1]. Others were cynical [S1, T2]. Others were concerned about political liability [S4, I2]. Others were nervous about losing control of their knowledge for security or power reasons [S3, S4]. In response to this variability, the KM Transition team used the information audit to prioritize knowledge for transition based on whether it was deemed critical, important, or useful knowledge and by the degree of difficulty to transition it. If knowledge was deemed critical, extra efforts were used to persuade reluctant staff to participate, frequently enlisting senior USG leadership to remind units of their obligations [I2].

Sharing and dissemination.

Leadership: Most sharing by KM team [S1, S2, T1, T2]. One of the most interesting discoveries during the KM Transition was how little knowledge was being shared between different USG

units doing the same kind of work. It was not until all the USG units from multiple provinces and networks came together in conferences and subject specific meetings organized by the KM Transition team, that staff from different agencies realized the kind of valuable knowledge that could have been shared between units all along. [T2] The atmosphere at these conferences and meetings was exciting as individuals met each other and immediately began helping each other [S2]. But it was also disappointing to recognize the lost opportunities [S1, S2, T1, T2]. After the first conference, the KM Transition scheduled more subject specific seminars and general education presentations to increase awareness about the value of ongoing interagency knowledge sharing, not just transitioning for the future.

Acquisition and application.

Newness: Novelty & staff turnover inhibited use [T3, T4]. The bulk of the KM Transition work aimed towards the production of the KM Directory, which would allow future USG staff in Iraq to find and access relevant knowledge. The use of this rich and useful directory and related KM resources was low in part due to the unique circumstances of the DOS mission in Iraq. First, DOS was new to operating in conflict environments such as Iraq. Few diplomatic staff had experience with operating in a combat and reconstruction environment. Most incoming officers were not familiar with what types of knowledge would exist in a combat/reconstruction environment, nor how to use such knowledge even if they knew where to look. Complicating matters was the fact that very few officers served more than one year in Iraq. The situation with local Iraqi staff was not much better. Because there was no diplomatic presence in Iraq for decades, there was no local staff. DOS hired Iraqis as quickly as possible, but they were eligible for a Special Immigrant Visa to move to the U.S. after just one year of service. This inhibited institutional memory and any tradition of referring to the KM Directory or other KM related resources [T3, T4].

Policy: No relevant KM policies reduced use [T3, T4, I1]. The KM Transition was an innovative and progressive move for DOS, but its success was impeded by the fact that no official KM policies or traditions were in place at DOS[8]. Standard USG records management policies existed, but archiving official records is not the same as knowledge management, which focuses on the active ongoing use of knowledge to improve efficacy and efficiency. Diplomatic and local staff had not developed the habit of thinking about, finding, or using interagency knowledge in any systematic way. This increased the time and effort required by the limited KM team [T3, T4, I1].

3.3 Components of Approach

Theories.

Definition: Many believed that KM was just technology [S1, S2, T2, T3, T4]. Many individuals and units were unclear about knowledge management [S1]. Many believed that saving information was important but did not feel they needed spend the time to identify relevant knowledge or ensure it remained accessible or findable [S1, S2, T2, T3, T4]. Knowledge

[8] Prior to computers, when the DOS Inspector General would review an embassy or a consulate, they measured the accuracy, completeness, and organization of paper filing systems and associated indexes. Units with inadequate filing systems were penalized. When DOS moved to electronic documents and communication, this measure of success disappeared.

management is not just about saving information, it is about assessing its value, organizing it for findability, and making it usable based on an understanding of potential uses. When the KM Coordinator contacted DOD Central Command (CENTCOM) to ask how to access files in the copy they had made of the entire USF-I Command network[9], she was told: "We have not finished indexing the files yet. Unless you know the exact name of the file and which unit it came from we can't really help." "When will the indexing be complete?" "About two years." Similarly, DOS sent a team to Iraq in 2010 to copy the hard drives of every PRT. When the KM Coordinator asked the DOS Historian how to access those files, she was told that they were on disconnected hard drives in a locked safe with no plans for indexing. [S2, T2, T3, T4]

Seeking and Use: Many could not envision future uses of their information [S1, T2, I1]. The KM and information science field generally has investigated many theories about how people search for information and why and how they use it. Many individuals and units in Iraq had their own ideas about the future value of information. Frequently, their views were cynical: "The U.S.is never coming back to Mosul, and nobody is ever going to call this guy. We don't need to save all this contact information, notes, and all these records of reconstruction details." But contact information for people in Ninewah province and records of structures the USG built in Mosul could have been useful to the USG during the ISIS invasion of Mosul. It would have allowed them to gain knowledge quickly of events on the ground and provide details of buildings or other resources to aid the Iraqi or Kurdish defense forces. [S1, T2, I1]

Content.

Interpretation: Interpretations of criteria for selecting knowledge to retain were variable [S1]. In the early stages of the KM Transition, two different data calls were made as an initial audit of what information would need to be transitioned. Some units felt that only official reports that had already been submitted were worth saving. Some felt that everything should be saved. [S1] The KM Transition team conducted an iterative process with both departing and remaining units to establish a set of criteria for selecting what knowledge to retain (Appendix 6.2) and met individually with people to help them understand how to best select or synthesize knowledge to be transitioned. In the case of the most critical information, and whenever else possible, knowledge proposed for transition was validated as useful with the unit that would be most likely to use the knowledge [S1].

Politics: The Wikileaks scandal had a significant negative effect on participation [S3, S4, I1]. The publishing of DOS and DOD documents on Wikileaks had damaged relations between DOD and DOS. During the KM Transition, some DOD personnel expressed a reluctance to share knowledge because DOS had removed easy access to DOS files for DOD personnel after the Wikileaks scandal [S3, S4, I1]. A DOS PRT Team Leader specifically said that he had been "burned by Wikileaks" (relationships with foreign officials damaged by the disclosure of his confidential cables about them) and would not share any knowledge from his PRT beyond the official reports required by his supervisors [S3, S4]. Some DOD officials were concerned (incorrectly) that the KM Transition was asking them to turn over control of files to DOS [S3].

[9] The USF-I command network was based in Baghdad. The operational divisions (North, South and Center) each had their own networks, not linked to the command network.

They did not trust DOS to properly dispose of records at the proper time, which they believed would leave DOD open to potentially damaging FOIA requests [S4, I1].

Obfuscation: KM uncovered gaps, overlaps and lack of integration [S1, S2, S3, S4, T1, T2, I1, I2]. In the process of tracking knowledge, the KM Transition team uncovered operational gaps and overlaps where units were not coordinating with each other. DOD had brought in food and fuel under military escort with permission of the GOI. DOS security protocols required escort vehicles and/or vendors to use In Transit Visibility (ITV) on their vehicles so their locations could be tracked in real time. In the process of transitioning software, the KM team discovered that different vendors were using incompatible ITV software and devices. They also discovered that different vehicle maintenance contracts covered different aspects of the ITV (vehicle, transponder, satellite time). Some contracts ended at different times causing gaps. And with consolidation of activities, the KM also discovered the USG had multiple contracts for the same service. Similarly, the KM Transition team identified integration problems in security where the Office of Security Cooperation – Iraq (OSC-I) had contracted their own security services who used different communication systems than the DOS Regional Security Office (RSO) that needed to communicate with them.

Tools.

Diversity: Many systems restricted centralization [T4, I1]. The ideal KM scenario would be to have one place to go that contains all the relevant knowledge. The information environment in Iraq, however, involved an incredible diversity of systems being used, even within one network. A single unit could have unit network folders of files, a SharePoint site, an Intellipedia page, and use the Department of State Message and Archive Retrieval Toolset (SMART) email archiving system. Some units, like PRTs, would also store information on their local partner DOD brigade network in network folders or DOD databases like the Combined Integrated Data Network Exchange (CIDNE). This made it virtually impossible to centralize information [T4, I1]. Additionally, policies changed from year to year. In 2010, DOS units were encouraged to put as much information as possible into Intellipedia, a Wikipedia-like encyclopedia for the USG. The following year, units were encouraged to save official records and emails in the new SMART system for email archiving [T4, I1].

Resources: Time and human resources available inhibited marketing of new tools [S4, T2, T3, T4]. The volume of knowledge to be identified, assessed, validated and transitioned was significant. The amount of time and man hours available to execute the transition was inadequate. Most USG employees in Iraq were doing the equivalent of two or more jobs (regular job and transition work). Few individuals served in Iraq for longer than 12 months. In addition, DOS employees were granted an average nine weeks leave during the year. This complicated knowledge transition as well as training and education efforts about available KM resources. [S4, T2, T3, T4]

People.

Personality: Personality & politics dictated uneven participation [S1, S2, S3, S4, T2, T3, T4, I1, I2]. As indicated above, individuals had different motives for participating. Some felt that the

KM initiative was a way of preserving their legacy and improving the effectiveness of the U.S. mission in Iraq. Some viewed the initiative as disarming them or taking their power away in relation to other units, government agencies, or foreign leaders. Some even genuinely felt that sharing their knowledge with DOS could put American lives at risk.

Leadership: Supervisors determined participation [S1, S2, S3, S4, T2, T3, T4, I1, I2]. The leadership of each unit had a huge impact on participation. Even when junior staff wanted to participate, if a supervisor was distrustful of the process it was easy for them to prohibit participation given the volume of work that all staff were responsible for during the transition. Conversely, during theater-wide briefings, when GEN Austin reminded all DOD staff to comply with the existing FRAGO and cooperate with the KM Transition, participation spiked.

Competency: Uneven technology competency inhibited progress [S2, S3, S4, I1]. In order to increase participation, the KM Transition focused on allowing individuals to share knowledge in the tools they already used (e.g., Intellipedia, SMART, SharePoint, CIDNE). The team discovered, however, that some individuals did not possess adequate skills in these tools, including some as basic as Excel. Not only did this slow progress, but it created tension when these individuals became defensive and obstinate as their inadequacies were revealed.

Processes.

Timing: Deadlines for site closures and unit/staff departures inhibited participation [T2, I1, I2]. It was a common scenario for the KM Transition team to receive emails from staff saying, "We're closing our site next week. What do I do for KM?" The most extreme time crunch occurred in late 2011. The KM Transition team had been transitioning the software applications DOS would need for food and fuel deliveries. This required changes to the software as well as a two-day process to transition food inventory. Site by site transitions were scheduled from July through December as the military moved out, north to south. In the last week of September the GOI rejected the USG proposal to maintain a residual military force in Iraq, and on the 1st of October GEN Austin issued a "Go to Zero" order requiring all enduring sites in Iraq to transition to DOS by the 15th of October. This rapid acceleration of transition activities resulted in knowledge gaps and software application problems [T3, I1]. These problems resulted in temporary food and fuel shortages in a number of locations [I2].

Validation: Often hard to validate that knowledge would be useful [S1, S2, S3, S4, T1, T2, I1]. A key aspect of KM is identifying enduring knowledge that will be useful to others. The KM Transition used a four part validation scheme as much as possible (see Appendix 6.3) [T1]. Frequently those in the field assigned more importance to certain knowledge, or the enduring unit would confirm the value but acknowledge that competing priorities would reduce the likelihood of the knowledge being used [S1]. Sometimes the sharing unit would resist sharing unless the enduring unit assured them that all the knowledge would be used in a particular way [S3]. This thorough validation could only be executed for the most critical knowledge [S2, S3, S4, T2, I1].

Face-to-Face: In-person engagement made a significant positive difference [S1, S2, T2]. Two initial data calls for information at the beginning of the KM transition highlighted the extreme diversity in the value different individuals assigned to different types of knowledge. It became

clear early on that meeting face to face was essential to success. Meeting in person, the KM Coordinator or other team members could customize the description of the process and help the individual determine what knowledge to transition and how. In many cases, just sitting with an individual at their computer for an hour, discussing their workflow and reviewing their files and information management tools, was enough to have them "get it" and be confident that they knew what to do and could advise others in their unit. In other cases, face to face meetings enabled the KM Coordinator to ask questions that could identify and break through to what staff didn't know they knew (see section 3.1, Unknown).

Travel: Face-to-face engagement required travel, which was difficult on many levels [S4, T2, I1, I2]. Face to face engagement was exponentially effective at increasing high quality participation, but it was inhibited by time and travel complications. Travel anywhere in Iraq involved extensive logistical planning and time. Traveling a few miles down the road from the embassy to the USF-I headquarters at the airport took at least half a day. The KM Transition team had to compete for limited travel spots with other urgent transition business. Any visit to a remote site required logistical support by local personnel who were sometimes unwilling to cooperate. Flying around the country was frequently stalled for days at a time by sandstorms or security threats. All travel required the wearing of thirty pounds of personal protection equipment (PPE) and carried the risk of mortal danger.

3.4 Levels of Actors

Individual.

Motivation: Some saw value for the future, others saw only time/energy costs or threats [S1, S2, T3]. Many of the reasons for variable motivation have been discussed in earlier sections and were often unpredictable and unique to the individual. Some classes of individuals, however, displayed higher probabilities for certain levels of motivation. The longer an individual had served in Iraq, the more likely they were to want to participate. Contractors and 3161 personnel[10] often served multiple years in Iraq and developed continuity of relationships with local contacts and investment in projects and programs. Officers who had suffered damage to relationships due to Wikileaks were often more resistant.

Turf: Some simply didn't want to share [S1, S2, S3, S4]. As described in various sections above, many individuals viewed their knowledge as power and wouldn't share.

Group or community.

Secrecy: Some whole sections had cultures of not sharing information [S1, S2, S3, I1]. A number of units worked in spheres of knowledge that made them naturally resistant to sharing. Although the KM Transition team ran parallel strategies in unclassified, secret, and top secret realms, units like the USF-I J2 (intelligence) and J5 (plans) and the Federal Bureau of Investigation still remained extremely cautious about sharing anything. The most successful strategy in these cases

[10] Most USG departments and agencies in Iraq hired private companies to provide support, from facilities management to intelligence gathering. DOS did not have enough foreign service officers to fully staff the expanded operations in Afghanistan, Iraq, and Pakistan and was allowed, under 5 U.S. Code 3161, to create a temporary organization to hire "temporary diplomats" (aka "3161s") to fill the needs of their "expeditionary diplomacy" strategy.

was to convene working groups to identify and validate knowledge to transition. For example, the Vetting Working Group (known locally as the "Bad Guys" group) included members of the USF-I J2, FBI, and DOS Consular and Political sections.

Procedures: Some sections had preferred methods of KM [S1, S3, T1, T2, I1, I3]. As noted previously, different units and unit leadership had developed preferences for different tools. In terms of ensuring knowledge was not lost, this was not problematic. But in terms of sharing relevant and useful knowledge, other units with different preferences were less likely to seek out knowledge in tools they were less familiar with.

Organization as a whole.

Leadership: Advocacy by senior leadership in Iraq increased participation [S1, I1, I2]. In the absence of any KM Transition team authority to mandate participation, formal and informal advocacy by DOS Assistant Chief of Mission for Assistance Transition AMB Peter W. Bodde, USF-I Chief of Staff LTG William B. Garrett III, and USF-I Commander GEN Lloyd J. Austin III was absolutely critical.

Policy: Lack of relevant department-wide KM policies inhibited participation [S1, I1]. As discussed above (see section 3.2, Policy), the lack of formal KM policies and procedures (including incentives and consequences) undermined the ability of the KM Transition to succeed. In 2016, Ambassador Peter W. Bodde informed this author that DOS has begun efforts to develop a department-wide KM program. Ideally this will provide foundation for more effective USG KM in future conflict environments.

3.5 Successes and Failures

Degrees of success in the Iraq KM Transition correspond with phases of the KM cycle. The project succeeded in capturing virtually all of the most critical knowledge, and much of the important knowledge. It was successful in sharing captured knowledge through a directory and summary briefs. The project was less successful in developing a culture that would actually acquire and apply the knowledge retained. The degrading degrees of success seem connected to specific phenomena identified by social informatics research, such as temporal and spatial constraints, diverse theories and fears about knowledge among participants, and political and systemic issues in the relevant organizations. Without authority to directly mandate and/or adequately incentivize participation in the KM process, the KM team's ability to defeat, neutralize, work around or leverage socio-technical factors determined much of the outcome.

One of the over-arching reasons individuals were so resistant to transitioning their critical information can be explained by Jonathan Grudin's work on why computer-supported collaborative work (CSCW) applications fail [9]. Those being asked to do the KM work would be leaving Iraq within weeks, never to return. They would never directly benefit from their KM efforts, so it was a battle to convince them to assist.

The systematic naming and locating of these SI challenges in the KM process aided the author in explaining successes and failures of the Iraq KM Transition. It also enabled her to make specific and clear recommendations for adjustments to KM Transition efforts being planned in Afghanistan when she consulted with leadership and multiple DOD and DOS units in Kabul in 2013.

4 Conclusion

The most significant lesson learned in the Iraq KM Transition was that technology tools and related guidelines for staff were the smallest part of the effort to leverage institutional knowledge improve efficacy and efficiency. Regardless of how sophisticated or user-oriented the tools appear to be, individual motivations were incredibly variable and institutional contexts (culture and bureaucracy) contained hidden obstacles that were frequently formidable. The success of the KM transition was inhibited to varying degrees in three key components recommended as essential for any KM effort: 1. An adequately staffed KM team skilled in social informatics principles and creative enough to execute interpersonal strategies and tactics with nimble maneuverability and fortitude; 2. Institutional KM policies that are enforceable, with punitive and/or reward consequences; and 3. Senior leadership that visibly advocate KM and actively model the behavior required of staff. For any organization encountering resistance to KM work and facing down-sizing or significant changes, a KM endeavor can feel like combat. Lessons learned in managing the socio-technical factors of KM in Iraq can inform KM practices in these non-combat settings.

5 ACKNOWLEDGMENTS

The author would like to recognize Ambassador Peter W. Bodde and LTG William B. Garrett III for their visionary and unflagging leadership. Elizabeth Slater and LTC Bob Cunningham were outstanding daily partners. Beth Zentmeyer and Maysa Ashhab provided tireless support. LTG Ervin J. Rokke (Ret.) brilliantly steered the author to COL John Boyd's transformational theories and approaches to combat and change. Dr. Catherine Blake provided valuable editing guidance. The author also thanks the thousands of U.S. soldiers, diplomats, and civilians who contributed their knowledge and energy to the KM Transition; the Iraqi staff and colleagues that risked their lives to collaborate with the U.S. towards a better future for Iraq, and; the support staff from dozens of countries around the world that kept her safely transported, housed, fed, and otherwise able to conduct this important work.

6 Appendices

6.1 Glossary of Acronyms

AIDNet	U.S. Agency for International Development Network
AMB	Ambassador
CENTCOM	Central Command of the Department of Defense (Middle East, North Africa, and Central Asia)
CIDNE	Combined Information Data Network Exchange, DOD
CLASSNet	Classified Network, Department of State
COL	Colonel
CSCW	Computer Supported Collaborative Work
DOD	Department of Defense
DOS	Department of State
GEN	General

GOI	Government of Iraq
FOIA	Freedom of Information Act
FRAGO	Fragmentary Order, DOD
ICT	Information and Communication Technology
IG	Inspector General
IRM	Information Resource Management, DOS
ITV	In Transit Visibility
J#	Joint (Army, Air Force, Marines, Navy, Coast Guard) USF-I staff directorate codes: J1-Personnel, J2-Intelligence, J3-Operations, J4-Logistics, J5-Plans, J6-Communications, J7-Engineering, J8-Finance, J9-Public Affairs
KM	Knowledge Management
LTC	Lieutenant Colonel
LTG	Lieutenant General
NIPRNet	Non-classified Internet Protocol Router Network, DOD
OODA	Observe, Orient, Decide, Act; OODA Loop theory, COL John Boyd
OpenNet	Unclassified Network, Department of State
OSC-I	Office of Security Cooperation – Iraq, DOD
PRT	Provincial Reconstruction Team
RSO	Regional Security Office, DOS
SI	Social Informatics
SIPRNet	Secret Internet Protocol Router Network, DOD
SIV	Special Immigrant Visa
SMART	[Department of] State Messaging and Archive Retrieval Toolset
SOFA	Status of Forces Agreement
TS/SCI	Top Secret/Sensitized Compartmented Information
USAID	United States Agency for International Development
USF-I	United States Forces - Iraq
USG	United States Government

6.2 Criteria to identify knowledge for potential transition and enduring access

Files, excerpts, summaries, contact data and other that would:

- Contribute to the security of USG personnel
- Enable full and accurate provincial profiles
- Enable full and accurate sector profiles
- Enable full and accurate USG investment profiles
- Improve efficiency of management and logistics (especially for enduring sites)
- Identify all USG programs that an Iraqi participated in
- Prevent inappropriate granting of USG benefits to non-Americans
- Leverage previous USG activities and prevent the repetition of mistakes (best practices, lessons learned)

6.3 Knowledge validation process

1. Review potential files/datasets/software
2. Consult with source unit to identify perceived value to enduring mission
3. Discuss with interagency work groups
4. Confirm precise knowledge of value with potential future user unit

References

1. Belasco, A.: Troop levels in the Afghan and Iraq Wars, FY2001-FY2012: Cost and other potential issues. Congressional Research Service, 7-5700, R40682. (2009)
2. Lamothe, D.: Diplomats, pilots and hired guns: Here are the Americans left in Iraq. Washington Post. (2014, June 12) Retrieved June 24, 2014 from http://www.washingtonpost.com/news/checkpoint/wp/2014/06/12/diplomats-pilots-and-hired-guns-here-are-the-americans-left-in-iraq/
3. Brennan, R.R.J., Ries, C.P., Hanauer, L., Connable, B., Kelly, T.K.: Ending the U.S. War in Iraq: The Final Transition, Operational Maneuver, and Disestablishment of United States Forces-Iraq. RAND Corporation, Santa Monica, CA (2013)
4. Coram, R.: Boyd: The Fighter Pilot Who Changed the Art of War. Back Bay Books, New York (2004)
5. Osinga, F.P.B.: Science, Strategy and War: The Strategic Theory of John Boyd. Routledge, Cheltenham (2006)
6. Dalkir, K.: Knowledge management in theory and practice. Elsevier/Butterworth Heineman (2005)
7. Leech, M., Anderson, C. and Mahoney, C.: Research-practice-policy intersections in the Pathways to Prevention Project: Reflections on theory and experience. In: France, A., Homel, R. (eds.) Pathways and crime prevention: Theory, policy and practice. Willan Publishing, Cullompton, UK (2007)
8. Kling, R., Rosenbaum, H., Sawyer, S.: Understanding And Communicating Social Informatics: A Framework For Studying And Teaching The Human Contexts Of Information And Communication Technologies. Information Today Inc., Medford, NJ (2005)
9. Grudin, J.: Why CSCW Applications Fail: Problems in the Design and Evaluation of Organizational Interfaces. In: Proceedings of the 1988 ACM Conference on Computer-supported Cooperative Work, pp. 85–93. ACM, New York (1988)