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Marine Forces Reserve: accelerating knowledge flow through asynchronous learning technologies

Nissen, Mark

Monterey, California. Naval Postgraduate School

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MARINE FORCES RESERVE:

ACCELERATING KNOWLEDGE FLOW THROUGH

ASYNCHRONOUS LEARNING TECHNOLOGIES

by

Mark Nissen, Robert McGuiness and Anthony Davis

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14. ABSTRACT
Most scholars agree that knowledge is key to competitive advantage. Organizations able to move dynamic knowledge quickly can outperform their rivals, peers and counterparts. The US Marine Corps is clearly a knowledge organization, and Marine Forces Reserve (MFR) is an organization exemplifying the need for rapid knowledge movement. Indeed, a key component to MFR success is the knowledge of Active Duty Inspector Instructors (I-Is), but a great number of them are required to take charge quickly—although most lack prior training and experience working with the unique and dynamic challenges of the Reserves—and their extant knowledge flows are relegated principally to questionably effective presentation slideshows and error-prone on the job training. Leveraging deftly the power of information technology—in conjunction with knowledge management principles, methods and techniques—we employ a class of systems used principally for distributed and remote learning, and we engage key subject matter experts at MFR Headquarters to accelerate the knowledge flows required for effective I-I performance. Preliminary results point to huge return on investment in terms of cost, and early indications suggest that training efficacy can be just as effective as—if not better than—accomplished through previous methods. This sets the stage for even more effective use of I-I personnel time and energy when they gather for their annual conference in New Orleans, and it highlights enhanced opportunities for continuing our acceleration of knowledge flows through online training and support—both for I-I personnel and across other MFR training populations. Further research, implementation and assessment are required, but results to date are impressive and encouraging.

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NAVAL POSTGRADUATE SCHOOL
Monterey, California 93943-5000

Ronald A. Route
President

Douglas A. Hensler
Provost

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Further distribution of all or part of this report is authorized.

This report was prepared by:

Mark Nissen
Professor
Naval Postgraduate School

Robert McGuiness
Information & Knowledge Manager
Marine Forces Reserve

Anthony Davis
G-3 Formal Training Program Manager
Marine Forces Reserve

Reviewed by:

Dan Boger, Chairman
Information Sciences

Released by:

Jeffrey D. Paduan
Dean of Research

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EXECUTIVE SUMMARY

It is difficult to find an organization that is *not* interested in competitive advantage in today's dynamic, global, highly competitive environment. Of the myriad different approaches to attaining and retaining competitive advantage, most scholars agree that *knowledge* is key: knowledge enables effective action; effective action drives superior performance; and superior performance supports competitive advantage. As such, organizations able to move dynamic knowledge quickly can outperform their rivals, peers and counterparts. Plus, once they attain a knowledge-based competitive advantage, many organizations are able to retain—and even expand—such advantage over time. Hence knowledge retains a special role in organization performance, mission success and competitive advantage.

The US Marine Corps is clearly a knowledge organization. Its longstanding efficacy—in combat and other domains—centers in greater part on dynamic knowledge gained through training, experience and doctrine than the weapons and other materiel employed. Further, the incessant rotation and turnover of its personnel exacerbate the need for rapid knowledge movement. Marines are deployed, stationed and relocated all around the world, and they must learn to perform effectively—as individuals, teams and coherent forces in expeditionary, joint and coalition operations—even before hitting the ground, often in circumstances precluding advance training or even face-to-face interaction.

Information technology (IT) plays a common role in attempts to enhance the performance of knowledge organizations. However, as evident from the term, *IT* addresses principally *information*, not *knowledge*, and IT alone is clearly inadequate to sustain knowledge-based competitive advantage. Hence information technology must be employed deftly—in conjunction with knowledge management principles, methods and techniques—in order to realize the performance benefits of dynamic knowledge for organization performance and competitive advantage.

Such deft employment of IT describes our approach to accelerating dynamic knowledge through Marine Corps organizations. In this research project we identify Marine Forces Reserve (MFR) as an organization exemplifying the need for rapid knowledge movement. Marine Corps Reserve units must be ready always to augment and reinforce the active component across the entire spectrum of military operations around the world, and they take pride in maintaining trained and experienced Marines.

A key component to the success of the Marine Corps Reserve is the knowledge of Active Duty Inspector-Instructors (I-Is). Each of the 120 Reserve Centers is staffed by a cadre of active duty Marines, who play key training, inspection, administration, support and other roles. All of these roles require considerable and diverse knowledge to perform effectively, but many I-Is arrive with no prior training or experience working with the unique and dynamic challenges of the Reserves. Nonetheless, they must take charge in such roles quickly, even though extant knowledge flows are relegated principally to questionably effective presentation ('Death by PowerPoint') slideshows and error-prone on the job training (OJT).

Moreover, the I-I Marines are distributed all across the continent and required to perform their roles without the nearby support of adjacent units and higher headquarters

(e.g., in some cases, only a single I-I can be found at a particular reserve location). Compounding such challenges from the tyranny of distance and isolation, the Reserve component presents unique business processes, requirements and legalities about which incoming I-Is have negligible opportunities for advance or rapid learning.

In short, the active duty I-I role is crucial to the success of the Reserves, but Marines serving in such role are not effectively onboarded and equipped with the essential sources of job knowledge. This marks the I-I role as both important and challenging in terms of moving knowledge effectively. Hence we target such I-I role as the focus of this study.

Leveraging deftly the power of IT—and understanding critically the inherent inefficacy of IT absent direct attention to the key knowledge underlying competent job performance—we first examine the dynamics of knowledge required to enable I-I personnel to perform effectively. The knowledge of experienced professionals at MFR Headquarters emerges as key in this light, as we identify and interact with subject matter experts (SMEs) across most key areas encompassing the I-I knowledgebase. We glean from such SMEs not only what knowledge is key and how it flows today, but also important constraints and limitations impeding current I-I knowledge flows. Geographical distribution, limited peer interaction, isolation from Headquarters' expertise, persistent job rotation, budget constraints and infrequent training opportunities all contribute to the knowledge flow issues.

Searching for IT that supports *knowledge* flows, we identify a class of systems employed principally for distributed and remote learning in an education environment, and we adapt such highly effective asynchronous learning techniques and technologies to the I-I training task. Substantial evidence indicates that—with informed instruction design and appropriate pedagogy—the efficacy of online education and training is comparable to—and in many cases *better* than—that of classroom teaching. This would appear to be the case in particular where such classroom teaching is relegated to a multiday battery of plenary presentation slideshows. The implications in terms of MFR I-I education and training are exciting.

In this technical report, we first summarize key aspects of the MFR organization and environment. We then describe the method employed to accelerate I-I knowledge flows via asynchronous learning technology, and we summarize in turn results to date. Although results are only just beginning to appear, we've identified the potential for huge return on investment in terms of cost, and early indications suggest that online training efficacy is as or even more effective. Further, our "teaching people to fish" approach has equipped the MFR organization with an organic capability to leverage the results of this work and to accelerate other key knowledge flows.

This sets the stage for even more effective use of I-I personnel time and energy when they gather for their annual conference in New Orleans, and it highlights enhanced opportunities for continuing our acceleration of knowledge flows through online training and support. Two approaches to such acceleration appear to be especially promising: 1) developing and implementing the asynchronous learning system, which can be consulted for reference and review in addition to initial learning; and 2) promoting both peer and headquarters mentoring, coaching and consulting, through which I-I personnel can identify and consult with one another in addition to the experts at Headquarters.

This sets the stage also to leverage the success of our current project to address other MFR training needs, and the approach offers potential for migration to other Marine Corps organizations. We address these additional opportunities as the report finishes by outlining key conclusions, limitations and suggestions for continued research along the lines of this project.

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I. INTRODUCTION

It is difficult to find an organization that is *not* interested in competitive advantage in today's dynamic, global, highly competitive environment (Matusik & Hill, 1998; Chaharbaghi & Lynch, 1999; Barney, 2002; Fahey, 2002; Teece, 2009). Of the myriad different approaches to attaining and retaining competitive advantage, most scholars agree that *knowledge* is key (Cole, 1998; Grant, 1996; Spender, 1996). Nissen (2006) explains how knowledge enables effective action; effective action drives superior performance; and superior performance supports competitive advantage. As such, organizations able to move dynamic knowledge quickly can outperform their rivals, peers and counterparts. Plus, once they attain a knowledge-based competitive advantage, many organizations are able to retain—and even expand—such advantage over time (Nissen, 2014). Hence knowledge retains a special role in organization performance, mission success and competitive advantage (Drucker, 1995; Grant, 1996; Spender, 1996).

The US Marine Corps is clearly a knowledge organization (Nissen & Oros, 2010). Its longstanding efficacy—in combat and other domains—centers in greater part on dynamic knowledge gained through training, experience and doctrine than the weapons and other materiel employed. Further, the incessant rotation and turnover of its personnel exacerbate the need for rapid knowledge movement. Marines are deployed, stationed and relocated all around the world, and they must learn to perform effectively—as individuals, teams and coherent forces in expeditionary, joint and coalition operations—even before hitting the ground, often in circumstances precluding advance training or even face-to-face (F2F) interaction.

Information technology (IT) plays a common role in attempts to enhance the performance of knowledge organizations (Becerra-Fernandez & Sabherwal, 2001; Choi, Lee, & Yoo, 2010; Martínez-Moreno, González-Navarro, Zornoza, & Ripoll, 2009; Maznevski & Chudoba, 2000; Montoya, Massey, & Lockwood, 2011; Samarah, Paul, & Tadisina, 2007). However, as evident from the term, *IT* addresses principally *information*, not *knowledge*, and IT alone is clearly inadequate to sustain knowledge-based competitive advantage (Nissen, 2006). Consider several prominent examples.

For a period of time in the Seventies, for instance, a few banks offering automated teller machines (ATMs) to customers enjoyed some competitive advantages over those without this technology, but today nearly every bank offers ATMs. Instead of conferring some competitive advantage, now ATM technology represents just another cost of doing business in banking. Computerized reservation systems (CRSs), as another instance, similarly conferred some competitive advantage to the pioneering airlines behind their development and initial deployment in the Eighties, but today nearly every airline uses CRSs. Instead of conferring some competitive advantage, now CRS technology represents just another cost of doing business in air travel. Leading-edge financial investment firms, as a third instance, gained some competitive advantage in the Nineties through computer trading systems for securities such as stocks, bonds and futures, but today nearly every financial investment firm trades securities as such. Instead of conferring some competitive advantage, now this information technology represents just another cost of doing business in securities financial investment.

The list of similar instances goes on and continues through cloud computing, mobile applications, tablets, social media and like trends that are current at the time of this writing. Hence IT must be employed deftly—in conjunction with knowledge management principles, methods and techniques—in order to realize the performance benefits of dynamic knowledge for organization performance and competitive advantage (Nissen, 2014).

Such deft employment of IT describes our approach to accelerating dynamic knowledge through Marine Corps organizations. In this research project we identify Marine Forces Reserve (MFR) as an organization exemplifying the need for rapid knowledge movement. Marine Corps Reserve units must be ready always to augment and reinforce the active component across the entire spectrum of military operations around the world, and they take pride in maintaining trained and experienced Marines.

A key component to the success of the Marine Corps Reserve is the knowledge of Active Duty Inspector-Instructors (I-Is). Each of the 120 Reserve Centers is staffed by a cadre of active duty Marines, who play key training, inspection, administration, support and other roles. All of these roles require considerable and diverse knowledge to perform effectively, but many I-Is arrive with no prior training or experience working with the

unique and dynamic challenges of the Reserves. Nonetheless, they must take charge in such roles quickly, even though extant knowledge flows are relegated principally to questionably effective presentation ('Death by PowerPoint') slideshows and error-prone on the job training (OJT).

Moreover, the I-I Marines are distributed all across the continent and required to perform their roles without the nearby support of adjacent units and higher headquarters (e.g., in some cases, only a single I-I can be found at a particular reserve location). Compounding such challenges from the tyranny of distance and isolation, the Reserve component presents unique business processes, requirements and legalities about which incoming I-Is have negligible opportunities for advance or rapid learning.

In short, the active duty I-I role is crucial to the success of the Reserves, but Marines serving in such role are not effectively onboarded and equipped with the essential sources of job knowledge. This marks the I-I role as both important and challenging in terms of moving knowledge effectively. Hence we target such I-I role as the focus of this study.

Leveraging deftly the power of IT—and understanding critically the inherent inefficacy of IT absent direct attention to the key knowledge underlying competent job performance—we first examine the dynamics of knowledge required to enable I-I personnel to perform effectively. The knowledge of experienced professionals at MFR Headquarters emerges as key in this light, as we identify and interact with subject matter experts (SMEs) across most key areas encompassing the I-I knowledgebase. We glean from such SMEs not only what knowledge is key and how it flows today, but also important constraints and limitations impeding current I-I knowledge flows. Geographical distribution, limited peer interaction, isolation from Headquarters' expertise, persistent job rotation, budget constraints and infrequent training opportunities all contribute to the knowledge flow issues.

Searching for IT that supports *knowledge* flows, we identify a class of systems employed principally for distributed and remote learning in an education environment, and we adapt such highly effective asynchronous learning techniques and technologies to the I-I training task. Substantial evidence indicates that—with informed instruction design and appropriate pedagogy—the efficacy of online education and training is at least

comparable to that of classroom teaching. Indeed, the educational psychology literature is replete with experiments comparing the efficacy of technologically intermediated distributed learning (e.g., videotape, TV broadcast with duplex audio, video teleconference, web-based instruction) with respect to the venerable F2F classroom teaching environment (Clark, 1983). Most studies show no significant differences (Allen et al., 2004; Russell, 1999).

After reviewing this literature, Bates and Poole (2003) summarize that, "… the research evidence indicates clearly that technology-based teaching can be just as effective as face-to-face teaching" (p. 19), indicating that technology can play an important and equally effective role in moving dynamic knowledge. Moreover, they go further by noting how technology enables some pedagogic techniques that are infeasible in the classroom, and they suggest that in some respects technologically intermediated learning can be even *better* than its classroom counterpart (p. 23). This would appear to be the case in particular where such classroom teaching is relegated to a multiday battery of plenary presentation slideshows. The implications in terms of MFR I-I education and training are exciting.

In the remainder of this report, we first summarize key aspects of the MFR organization and environment. We then describe the method employed to accelerate I-I knowledge flows via asynchronous learning technology, and we summarize in turn results to date. The report finishes by outlining key conclusions, limitations and suggestions for continued research along the lines of this project.

II. BACKGROUND

In this section we summarize key aspects of the MFR organization and environment. Marine Forces Reserve has the credo, “Ready, Relevant, Responsive.” This organization is responsible for the Marine Corps Reserve Component or "Reserves." Its mission is to prepare and provide Marine units and individual Marines as a suitable and ready operational reserve in order to augment and reinforce active forces for employment across the full spectrum of crisis and global engagement.

As illustrated in Figure 1, more than 100,000 Marines comprise the Reserves, with roughly 61% individual ready reserve, 34% selected reserve, and the remainder active reserve and individual mobilization augmentee. Roughly 300 civilians work within MFR also.

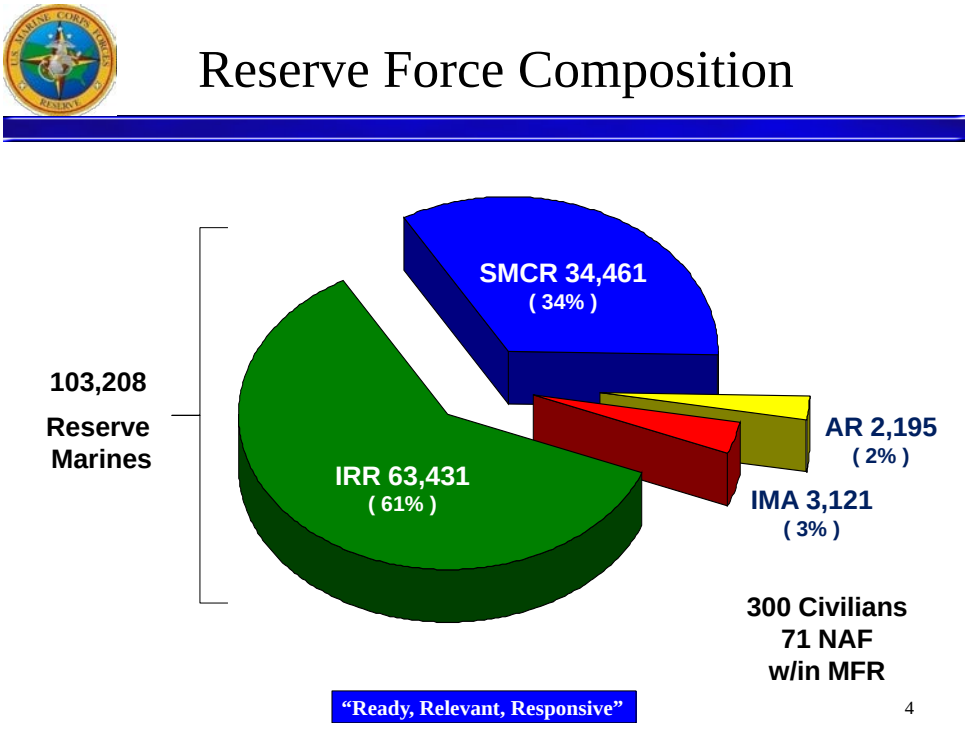

Figure 1 Marine Reserve Force Composition (adapted from MFR G-3, 2013)

The MFR organization chart is presented in Figure 2. Selected Marine Corps Reserve Marines drill with the 4th Marine Division, 4th Marine Logistics Group, 4th Marine Aircraft Wing and Force level units of MFR.

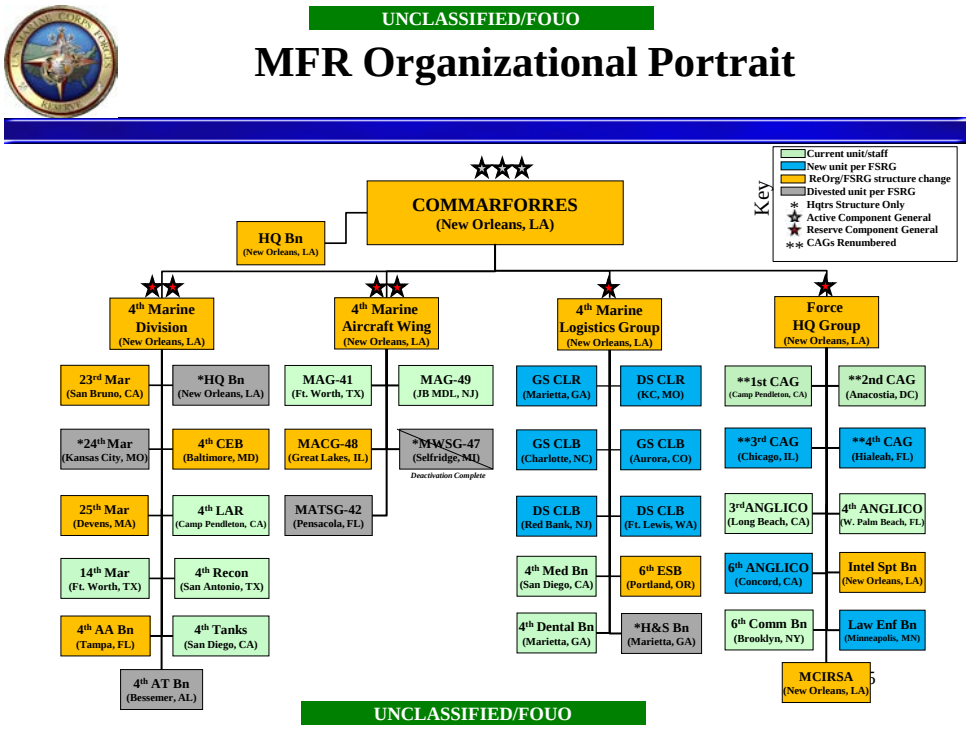

Figure 2 MFR Organization (adapted from MFR G-3, 2013)

Figure 3 shows the geographical distribution of the 120 MFR reserve centers. These centers span the continent and reflect considerable isolation, with many states including only a single center. MFR Headquarters is located in New Orleans.

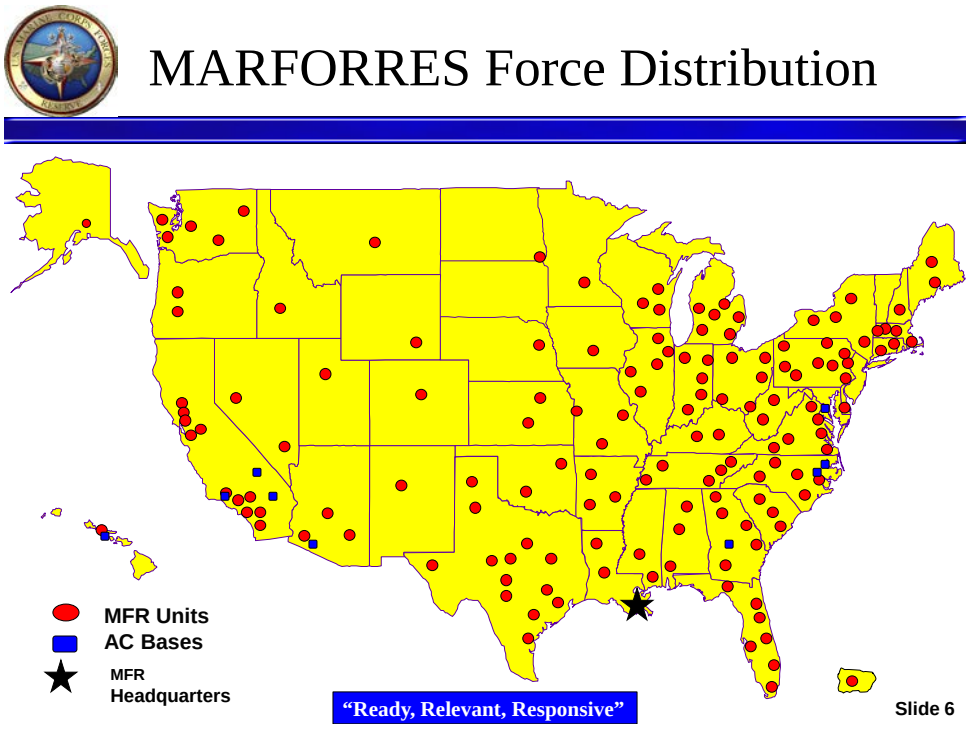

Figure 3 MFR Geographical Distribution (adapted from MFR G-3, 2013)

MFR units and Marines are employed around the world as depicted in Figure 4, and they participate in a variety of joint and service exercises worldwide also as shown in Figure 5.

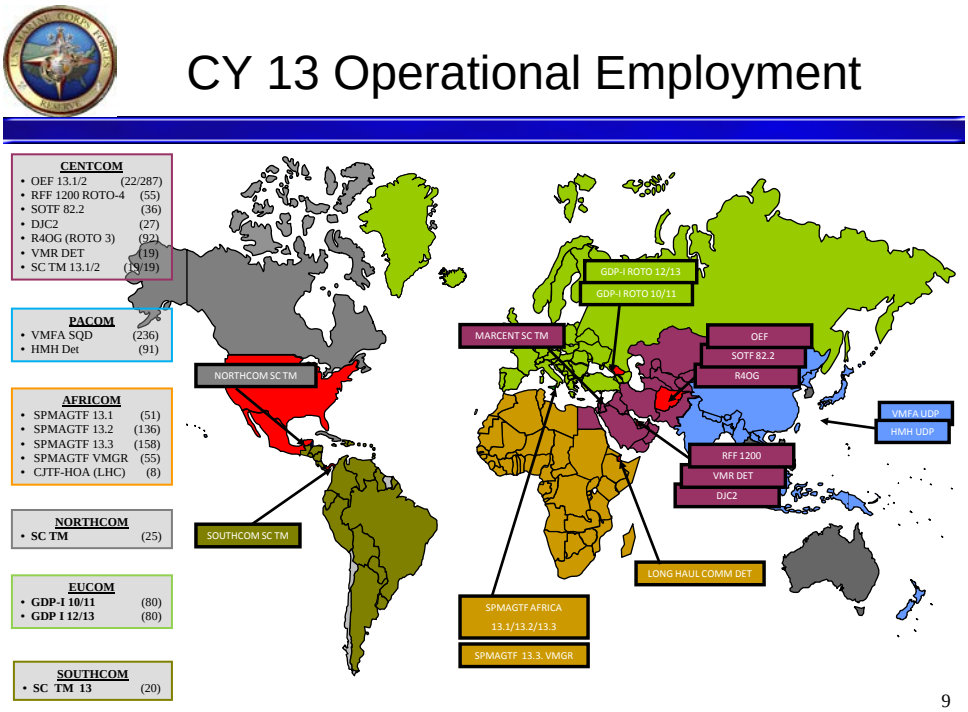

Figure 4 MFR Operational Employment (adapted from MFR G-3, 2013)

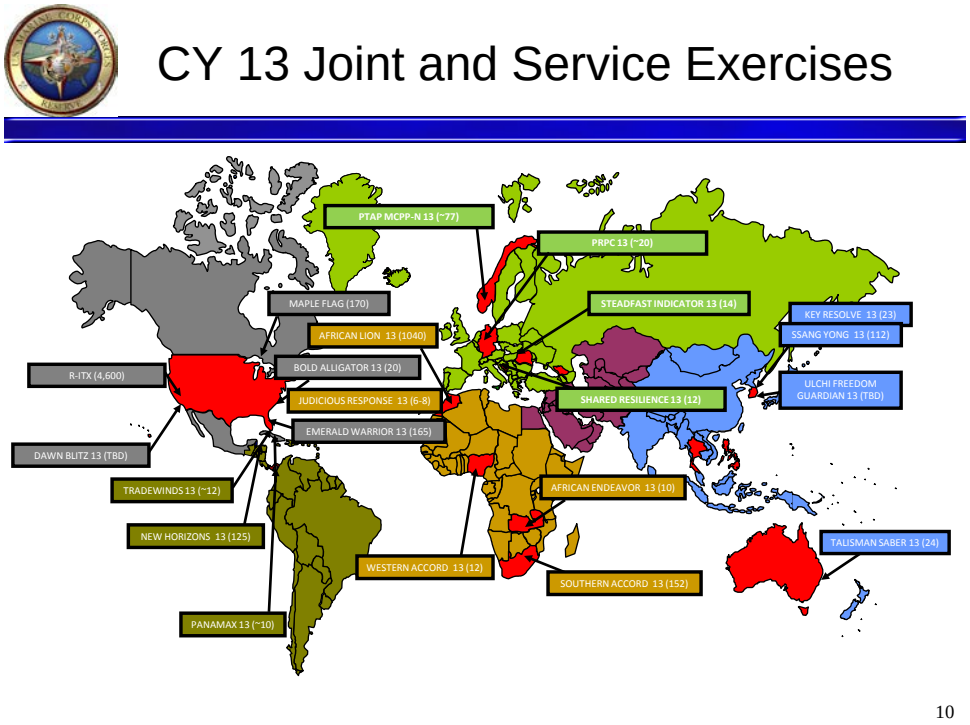

Figure 5 MFR Joint and Service Exercises (adapted from MFR G-3, 2013)

III. RESEARCH METHOD

In this section we describe the method employed to accelerate I-I knowledge flows via asynchronous learning technology. The principal method is characterized best as *case study*, through which we seek to learn about and generalize from in-depth investigation of an operating organization and enabling technology in the field (Benbasat et al., 1987). MFR represents a clear knowledge organization with an identified problem with its knowledge flows, particularly as they pertain to the I-Is. This provides us with an opportunity to study dynamic knowledge that is embedded within its context of organization work. Plus, this study is highly exploratory, not confirmatory, and we focus much more on theory building than theory testing. The case study method is very appropriate for examining dynamic knowledge within its embedded context as such (Eisenhardt, 1989).

As a key part of the Marine Corps, further, MFR represents an extreme organization, with personnel distributed geographically and assigned to rotate across many diverse job positions routinely. This complicates the organized and steady movement of knowledge considerably, and it highlights the generalizable knowledge that can be obtained through our study: if we can address the knowledge flow problems of such an extreme organization effectively, then we should be able to generalize and apply the results to myriad other (esp. less extreme) organizations. Such aspects suggest further that the case study method is highly appropriate for this research (Yin, 1994).

We employ multiple techniques for data collection in the field. Foremost, through a unique relationship between the Researcher's university and the U.S. Marine Corps, the Principal Investigator (PI) is able to collaborate very closely with a high level member of the MFR organization: the Information Manager & Knowledge Manager (IKM). The IKM is a retired Marine Officer, who has extensive inside knowledge of the MFR organization and unfettered access to its personnel. The PI and IKM collaborate seamlessly through data collection techniques including document review, interview, participant observation and prototyping.

Briefly, document review provides important background information about the MFR organization, roles, jobs, people, technologies and processes. It also helps the PI

and IKM to ask informed interview questions. This collaborative research team has ready and prolonged access to a wealth of documents during the study, and security clearances enable the review of practically any documents deemed to be pertinent. Further, through his official position in the focal organization, the IKM is able to interact with practically any person at any time during their working hours or to simply blend into the background and to observe the people, work processes and technologies in context.

Semi-structured interviews (Rubin & Rubin, 1995) are used at the beginning of the study, conducted with probing (Nelson et al., 2000) and snowballing (Reich & Kaarst-Brown, 1999) techniques, and they include participants spanning a wide range of different jobs, competencies and knowledge areas. In particular, MFR SMEs represent the predominate focus of our interviews. These SMEs are the people principally responsible for I-I training and support. I-Is are interviewed also, as are both technology and training representatives from the researcher's university and the focal organization alike.

However, most interviews are informal, with a nearly uncountable number conducted over the first three or four months of the study. The number, time and scope of interviews continue until theoretical saturation (Glaser & Strauss, 1967) is reached. Because so many interviews are conducted informally, and due to the IKM's inside position within the focal organization, we elect not to use a tape recorder for interviews or a camera for observations. Nonetheless, extensive notes are taken and summarized routinely, and the IKM's position enables him to follow up with interviewees where deemed necessary to clarify issues, to delve more deeply into topics of interest, or simply to verify facts, notes and comments recorded previously. Initial coding of data is conducted in a grounded theory manner, letting the data speak for themselves. This helps to ensure that initial interpretations are both grounded firmly in the data and meaningful to organization participants.

The Researchers' relationship with the focal organization enables ethnographic study through participant observation (Spradley, 1980) and includes an open invitation to participate in the Annual I-I Training Conference, which—along with OJT—represents the primary mode of knowledge flow when the study commences.

In addition to the methods and techniques outlined above (e.g., Glaser & Strauss, 1967; Rubin & Rubin, 1995; Spradley, 1980; Yin, 1994), the study also employs many of the proven tactics for qualitative research outlined by Miles and Huberman (1994: 262-276; e.g., spending a long time on site, taking a low profile, using SMEs, sampling people with different views, triangulating across multiple data-collection techniques) and others (e.g., cultural immersion, multiple verification efforts, *emic* perspective; see Bernard, 1998). Such tactics further serve to mitigate potential bias, and repeated member checking (Denzin, 1994) is accomplished through the IKM's daily interaction within the focal organization and periodic follow up with the many interviewees therein. Plus, a preliminary summary of study findings and implications is presented to an open audience of leaders in the focal organization, and a draft copy of study results is circulated for advance review within the organization also.

In terms of prototyping, one aspect of this case study can be characterized as design science (Hevner et al., 2004). MFR represents an operating organization with an identified problem regarding its I-I personnel, and we employ technology to redesign some key aspects of organization knowledge flows to address this problem, combining the background, knowledge and experience of academics and practitioners alike. From the academic perspective, we bring to bear the appropriate theories, models, frameworks and technologies to examine I-I knowledge flows, and from the practitioner perspective, we bring to bear deep inside knowledge of the focal organization, daily interaction with its key personnel, and trust-based working relationships with MFR organization SMEs, leaders and other highly informed people.

Within this study context, we seek to develop, test and examine the effects of a prototype technology intervention to accelerate I-I knowledge flows. Specifically, as noted above, we employ asynchronous techniques and technologies used principally for distributed and remote learning in an education environment, and we adapt them to the I-I training task. This involves aspects of information system design, development and testing (De Marco, 1978), the latter of which includes both alpha and beta testing of prototype training modules. We further develop metrics to assess the training efficacy of the prototype system for comparison with extant education and training methods.

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IV. RESULTS

In this section we summarize results to date. We organize the discussion into three parts: 1) knowledge flow analysis, 2) prototyping, and 3) implementation.

A. KNOWLEDGE FLOW ANALYSIS

Knowledge flow analysis pertains to understanding the dynamics of I-I knowledge, with particular attention to initial training and ongoing experience. These results are informed principally by our document review, interview and participant observation data collection efforts. We first summarize the key I-I knowledge areas. We then describe the current knowledge flow processes, after which we characterize alternate processes to accelerate knowledge flows.

1. Key I-I Knowledge Areas

MFR documentation outlines many important aspects of I-I work, and we have the opportunity to participate in the Annual I-I Training Conference two years in a row (2013 and 2014). We conduct interviews with conference organizers (esp. MFR functional organization leaders), instructors (esp. I-I SMEs) and students (esp. current and future I-Is). These people are all candid, highlighting both strengths and weaknesses of the current approach to I-I training and experiential development. We also sit in the audience and observe nearly all of the presentation slideshow sessions. As such we are receiving the same training benefit as the I-Is themselves.

Regarding dynamic knowledge and recapitulating from above, I-I knowledge represents a key component to the success of the Marine Corps Reserve. Each of the 120 Reserve Centers is staffed by a cadre of active duty Marines, who play key training, inspection, administration, support and other roles. All of these roles require considerable and diverse knowledge to perform effectively. Indeed, roughly 50 different training modules are presented during the annual I-I conference, consuming the major part of a whole work week. Such knowledge spans the entire organization (e.g., personnel, administration, intelligence, operations, logistics, planning, information technology, training), and it has taken MFR many years—even decades—to master. We summarize

the primary knowledge areas in Table 1. This does not include other fundamental and essential knowledge such as leadership, planning, organization and like areas learned by Marines throughout their military careers.

Table 1 I-I Primary Knowledge Areas

Organization	Knowledge
G1 – Administration	Adjutant, Manpower, MCLO, Operations
G2 – Intelligence	CI/HUMINT, Command Language, Intelligence Oversight, Intelligence Operations, RCLF, Resources, RICL, SSO
G3/5 – Operations & Planning	MCCLL, Mission Assurance, Readiness, TEEP, TPFDD
G4 – Logistics	Ammunition, Distribution Management, Food Services, Health Service Support, Maintenance, Logistics Operations & Plans, SMO, Supply
G6 – Information Technology	Cyber Security, EKMS, MITSC Reserve, Information Technology Operations, R&R, Ground Electronics Maintenance, ITPRAS, MFD/Printers
G7 – Training	Assistance and Investigations, Functional Areas, Inspections
Others	Resources, Facilities, MCCS, Comptroller, Public Affairs, SJA, Chaplain, Counsel, EOA, IM/KM, RCO, Safety, SAPR, Security

2. Current Knowledge Flow Processes

Two principal organization processes drive knowledge flows at present: 1) presentation slideshows and 2) on the job training. Multiday batteries of slideshow presentations, which transmit information but impart negligible actionable knowledge, are questionably effective and referred to pejoratively as “Death by PowerPoint” by many; and OJT, which is a euphemism for trial and error learning (Nissen, 2014), is notoriously error-prone. Although MFR Headquarters employs many highly knowledgeable SMEs, and such personnel are available to assist I-Is with various issues, the geographic distribution of I-Is across the country prohibits close SME interaction, and there are rigid limits to how many I-Is any single SME can assist simultaneously. Budget constraints limit the ability of MFR to augment its SME cadre.

I-Is also have access to regulations, standard operating procedures and manuals, but such documents tend to be written in a comprehensive, legalistic manner and are not conducive to rapid learning. Indeed, they represent just in case (JIC) knowledge, whereas the I-Is require access to knowledge just in time (JIT) instead. Further, such documents must pass through a thorough review cycle, and hence are difficult to keep up to date, and

they tend to be written in a relatively general nature, whereas each I-I encounters a somewhat unique set of issues and organization environment.

Drawing from Knowledge Flow Theory (Nissen, 2006), we delineate the two principal knowledge flow processes (i.e., presentation slideshows, OJT) via the five dimensional diagram presented in Figure 6. Characterizing the five dimensions briefly (see Nissen, 2014 for details), the vertical axis (labeled "Explicitness") delineates the extent to which knowledge has been articulated in explicit form (e.g., via documents, charts, graphs, software, products). The lower part of this axis near the origin depicts tacit knowledge (e.g., experience, know-how, understanding), and the dimension represents knowledge across the range from tacit to explicit end points.

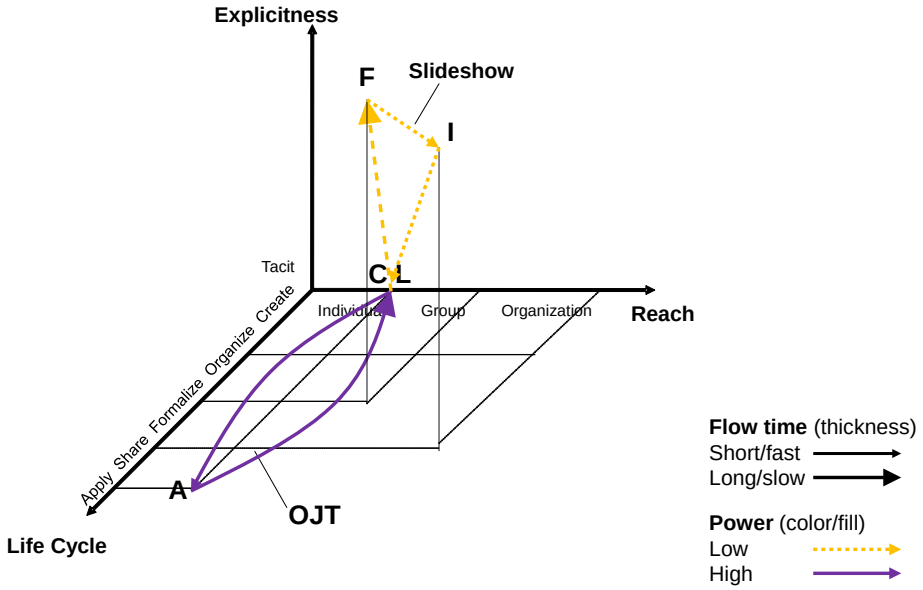

Figure 6 Principal I-I Knowledge Flows

The horizontal axis (labeled "reach") delineates the extent to which knowledge has proliferated through an organization (e.g., flowing from individuals, through groups, to organization wide movement). The left part of this axis near the origin depicts individual knowledge—whether tacit or explicit—that has not been shared, transferred or

moved otherwise beyond a single person, and the dimension represents knowledge across the range from individual to organization[1] end points.

The third axis (labeled "life cycle") delineates the activity associated with knowledge and includes five classes (i.e., create, organize, formalize, share, apply). The upper part of this axis near the origin depicts knowledge that has been created or learned—whether tacit or explicit, at any level of reach—and the dimension represents knowledge across the range from creation and organization, through formalization, to sharing and application. These first three dimensions are orthogonal and useful as independent variables.

Because it is very difficult to visualize beyond three dimensions, instead of using another dimensional axis, we integrate the fourth dimension (labeled "flow time") by using lines of different thickness to delineate diverse knowledge flows within the other three dimensions. In particular, we depict relatively fast flows—whether tacit or explicit, at any level of reach, corresponding to any life cycle activity—of knowledge (i.e., requiring short amounts of time to flow from one point in the figure to another) with thin lines, and we represent their comparatively slow counterparts (i.e., requiring long amounts of time to flow from one point in the figure to another) with thick lines.

Finally, the fifth dimension (labeled "power") delineates the degree to which knowledge—whether tacit or explicit, at any level of reach, corresponding to any life cycle activity, whether flowing quickly or slowly—can be put to use through action. High power knowledge (e.g., possessed by an expert in some domain or master in some field) can be put into action very effectively, whereas low power knowledge (e.g., possessed by a novice in some domain or student in some field) fails to produce such effective action. High power knowledge flows are depicted by solid (purple) lines, and their low power counterparts are represented by dotted (orange) ones.

These latter two dimensions can be used to represent a huge variety of diverse knowledge flows. They co-vary with the other three dimensions, however, and hence are useful as dependent variables. Indeed, we measure knowledge flow time and power to assess the performance of knowledge flows in an organization.

[1] This dimension can extend clearly beyond a single organization also (e.g., interorganization knowledge flows), but we limit the discussion here to the MFR Organization.

Within this five dimensional diagram, two knowledge flows are delineated. The presentation slideshow knowledge flow is depicted in three parts. Beginning at Point C in the figure, tacit knowledge is created or learned by some individual in the organization, perhaps through many months or even years of experience. The flow from Points C to F reflects a group of such individuals formalizing their collective experiential knowledge. In the case of MFR I-Is, these represent SMEs and others who work together to create presentation slideshows. This knowledge flow is depicted as a relatively thick (i.e., long flow time) line, indicating that considerable time is required to convert one's tacit experiential knowledge into training materials, and the flow is represented further as a dotted orange (i.e., low power) line, indicating that knowledge articulated into presentation slideshows does not carry the same power as the experiential tacit knowledge possessed by the SME. Knowledge gained by reading a set of presentation slides about marksmanship, for instance, does not have the same power (esp. for hitting a target) as corresponding knowledge gained though months or years of shooting experience.

The second part from Points F to I reflects the sharing of explicit knowledge after having been formalized. In this I-I case, this represents the sharing of presentation slideshows—whether as email attachments, website materials or via training conference sessions—and the corresponding knowledge flow is depicted as a relatively thin (i.e., short flow time) dotted orange (low power) line. This indicates that, especially once put into digital format on the network or shown to an auditorium full of I-Is, such knowledge can be shared very quickly, but as above its diluted power does not have the same actionability as the corresponding tacit knowledge from which it is derived.

The final part extends between Points I and L. This represents the community of I-Is learning from the presentation slideshows. Such learning can be via reading the slides as email attachments or by sitting through plenary training sessions in an auditorium. The thin, dotted orange line has the same representation as above: such knowledge flows quickly but lacks power.

The OJT flow is depicted in two parts. Beginning at Point C in the figure, tacit knowledge is created or learned by some individual in the organization, in this case by an MFR I-I Marine learning through on the job experience (e.g., a mistake). Such newly

learned knowledge is then applied at Point A, where it is put into action. The knowledge flow between Points C and A is shown via a thin (i.e., short flow time) solid purple (i.e. high power) line. This indicates that one can generally put even newly learned knowledge into action relatively quickly, and it denotes high power knowledge learned through experience. Alternatively, the flow between Points A and C is shown instead via a thick (i.e., long flow time) solid purple (i.e. high power) line. This indicates that one generally requires considerable time to learn new knowledge through experience (esp. via trial and error) but that such knowledge carries high power for actionable application.

These two parts connect, depicting the iterative nature of OJT knowledge flows: one applies his or her extant knowledge, observes the result, and learns—gradually—over time, repeating the knowledge creation-application (i.e., learning and applying new knowledge) cycle indefinitely or until reassigned to a different job. Further, notice that the OJT and presentation slideshow knowledge flows are linked; that is, Point C (corresponding to new learning or knowledge creation from experience) coincides with Point L (coinciding with new learning from the presentation slideshow). Once the training presentation slideshows are complete, the I-Is go or return into the field and apply (at Point A) whatever knowledge has been gained on the OJT flow, through which they learn by experience (at Point C), and so forth.

To summarize, the presentation slideshow flow—once formalized via course presentation slides—is comparatively fast (i.e., short flow time) but carries diluted power (e.g., enables marginal work performance), whereas the OJT knowledge flow is relatively slow (i.e., long flow time) but carries high power (e.g., enables effective work performance). Thus both flows have comparative advantages and disadvantages. The fast knowledge flow speed of slideshow presentations is offset by the diluted power to enable effective work, and the high power carried via OJT knowledge flows is offset by the long time required for experiential knowledge to accumulate.

3. Alternate Processes to Accelerate Knowledge Flows

We understand from KFT and knowledge management principles that many additional knowledge flows are possible within MFR in general and among the I-Is in particular, and we suspect that one or more such additional flows would be quite

beneficial in terms of accelerating I-I knowledge flows and increasing job performance. For instance, we might be able to enhance the presentation slideshow knowledge flow by increasing the pedagogic efficacy of I-I training. One example would center on a more effective training course. As another instance, we might be able to increase the efficiency of the current presentation slideshow knowledge flow by obviating the need for I-Is to gather physically for the Annual Training Conference. One example would center on a distributed training course.

Of course these two examples could be combined via a more effective training course that is delivered via network, whenever each I-I needs it, instead of annually in an auditorium. As such, one would expect for the slideshow knowledge flow depicted in the figure above to shift along the lines delineated in Figure 7. Notice that the third part extending between Points I and L is thin and solid (purple) here, whereas it was dotted (orange) above in Figure 6. This indicates that the online training knowledge flow to the community of I-Is could carry high power (solid purple line) yet deliver such knowledge quickly (thin line).

Moreover, because each I-I would have the ability to complete (and review) such online course materials whenever he or she felt the need, the corresponding knowledge could flow just in time (i.e., JIT, not JIC), throughout each individual I-I's job assignment, and in accordance with the idiosyncratic timing associated with each reserve center in which the various I-I worked. Plus, it is further likely that such online course would be less costly to develop, administer and maintain than the current Annual I-I Training Conference, hence producing a positive return on investment financially as well as via enhanced knowledge flows. Verifying such positive return represents an empirical question for follow-on research, but we can sow the metaphorical seeds now.

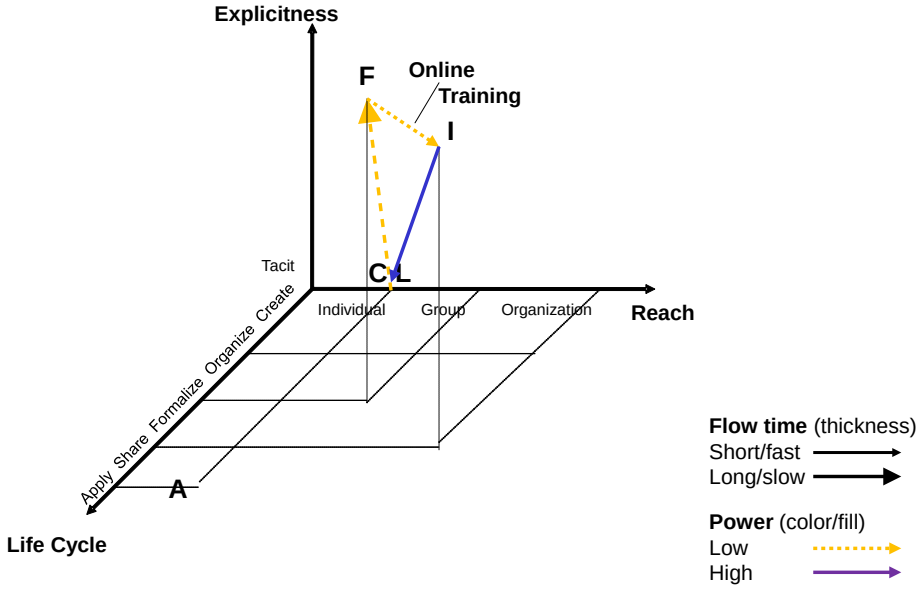

Figure 7 Enhanced I-I Training Knowledge Flow

Additionally from KFT and knowledge management principles, accelerated knowledge flows addressing the tacit learning associated with OJT are possible and potentially quite beneficial too. For instance, the I-I community could be enhanced to facilitate peer mentoring between diverse I-Is stationed at various reserve centers across the country. One example would center on community building activities to help individual I-Is meet, get to know, and learn to trust and seek assistance from one another. As another instance, MFR SMEs could spend an increased portion of their work days mentoring and coaching individual I-Is. One example— through mentoring and coaching at their respective reserve centers—would center on SMEs helping individual I-Is to avoid having to learn from mistakes.

Of course these two examples could be combined via SME-led I-I community building and mentoring activities. Various topics of importance could be taught, by SMEs, to small groups of I-Is whose reserve centers are geographically close to one another, for instance, with a half dozen or so I-Is traveling a relatively short distance to meet and learn from a particular SME (e.g., G1 – Adjutant expert) at one particular

reserve center. This could occur, say, during the first month or quarter[2] of the fiscal year. The idea would be that the SME would be coming to help solve a particular problem faced by the "host" I-I, acting therefore more as a consultant than a trainer per se, with the other I-Is likely to experience the same problem at some point. The individual I-Is could get to know the SME better, and vice versa—with SMEs even making themselves more available for remote problem solving and assistance via email, telephone, skype and other media—in addition to getting to know other I-Is and having ample opportunity to discuss common problems and issues.

Then a different SME (e.g., G2 – Cyber Security) could lead another problem solving session attended by these same half dozen I-Is at a different reserve center the following month or quarter, and the I-Is could be encouraged (even incentivized) to meet weekly or monthly in between such respective monthly or quarterly SME sessions. So long as the sessions are viewed as value added activities by the I-Is, the time would likely be well-spent, and their individual OJT knowledge flows would accelerate through ongoing SME mentoring, coaching and consulting. Moreover, the I-Is would gain a community of geographically close peers willing to make themselves available and to help answer questions, solve problems, identify resources and share effective techniques. These are the same kinds of knowledge-rich conversations that take place among Marines in the mess tent following patrols or like maneuvers in the field, but in this case the "patrols" and "maneuvers" pertain to I-I work, and the Marines are assigned to diverse reserve centers across the country.

[2] The frequency could vary across reserve centers and subject areas to address individual needs and circumstances.

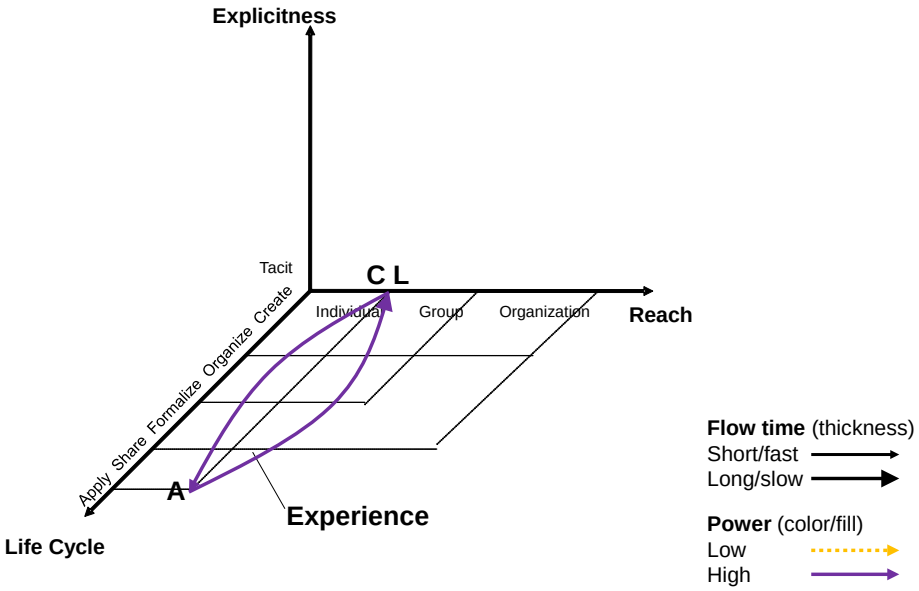

Figure 8 Enhanced I-I Experiential Knowledge Flow

The likely effect is delineated in Figure 8. Here we depict the experience knowledge flow via two parts, like OJT, consisting of knowledge application and learning. The dynamics are similar, but notice how the knowledge flow line between Points A and C is thinner (i.e., faster) than its OJT counterpart delineated in Figure 6 above. This suggests that the OJT knowledge flow from above is enhanced by the SME mentoring, coaching and consulting, in addition to community support from other geographically close I-Is, thereby decreasing the flow time without sacrificing (indeed most likely increasing) knowledge power. As with the online training course discussed above, this approach would likely produce positive returns on investment. Verifying such positive return represents an empirical question for follow-on research, but we can sow the metaphorical seeds now.

To summarize our I-I knowledge flow analysis, we find opportunities to enhance both explicit and tacit knowledge flows. The online I-I training course represents a highly promising approach to addressing deficiencies observable in the presentation slideshow knowledge flows. This would likely be the case even if we simply convert the existing SME slideshow materials used for the Annual I-I Training Conference to an (effective)

online format, but it would be even more so if we can enhance the course pedagogy too. Perhaps this outlines a natural two-step process: 1) we first convert the existing SME slideshow materials for online delivery in an effective way; and after some testing, review and analysis, 2) we enhance the pedagogy of these training materials.

Likewise, the program of SME-led mentoring, coaching and consulting—in addition to I-I community building—represents a highly promising approach to addressing deficiencies observable in the OJT knowledge flows. This would likely be the case even if we simply start with promoting, facilitating and encouraging (incentivizing) regional interaction and joint problem solving by geographically close I-Is, but it would be even more so if we can get SMEs out into the field to help solve specific I-I problems and to help stimulate I-I community building.

B. PROTOTYPING

Prototyping refers to system design, development and testing, and here it applies to the use of asynchronous learning technologies to enhance the I-I training knowledge flows discussed above. Recall, for instance, that we identify two parts to such enhancement: 1) convert existing SME slideshow materials for online delivery in an effective way; then 2) enhance the pedagogy. We address the first part in this present study and leave the second part for future research. To help organize the discussion, we divide it into two parts. The first outlines the process of assembling a team and devising an approach. The second provides an overview of the course prototyping effort.

1. Team and Approach Development

We assemble an excellent team of experts across various domains to assist with the prototyping effort. This team includes information technology specialists, instruction designers, asynchronous course instructors and others. These people understand the techniques and technologies of quality online course development. This team includes the MFR IKM, a G3 Program Manager (PM), I-I SMEs and others also. These people understand the people and processes of MFR training and operations. Considerable analysis and interaction leads us to select an asynchronous education and training platform called Sakai, which represents open source technology licensed by the

Researcher's university and used extensively for online graduate education. The idea is to develop a set of I-I training materials for delivery via Sakai, and the initial goal is to convert all current material used for the Annual I-I Training Conference. With the additional capabilities of the Sakai environment, however, we also identify opportunities to extend beyond just the current conference materials, and we describe our prototype system design and implementation further below.

2. Course Prototyping Effort

One explicit goal of this system development effort is that the MFR organization learns to develop and maintain its own course modules. This helps to limit its organization dependence upon the Naval Postgraduate School (NPS: the PI's university), and it enables MFR to leverage the technology to develop other online courses beyond I-I training. We follow a three step process: 1) proof of concept development, 2) joint prototyping, and 3) SME course development.

a. Proof of Concept Development

In the first step, the PI works closely with technical and instruction design experts to develop rapidly and iteratively one proof of concept course module to review with the MFR IKM and G3 PM. This proof of concept module exhibits a pedagogically sound set of learning activities and undergoes numerous iterations and refinements before the participants are happy with it. We agree jointly that every course module should follow a standard format, and we identify and prototype five learning sections for each module: 1) an introduction, 2) narrated presentation slides, 3) review questions, 4) references and 5) information request. An example introduction is shown in the Figure 9 screenshot for the G1 – Adjutant Funeral Honors module.

Figure 9 Course Module Introduction

In terms of the presentation slides, we take the current slideshow presentations developed by SMEs and convert them for online viewing. Additionally, each SME records a narration for every slide, giving the I-I student a combination of audio and visual inputs comparable to what would be experienced during the Annual I-I Training Conference. Moreover, because the student is in control of the slide presentation, he or she can view each slide as many times as necessary to glean the key information, including repeated playback of the recorded narrative. Figure 10 shows a screenshot for the Funeral Honors module title slide. The green horizontal bar at the bottom shows progress as the narration is heard for that slide.

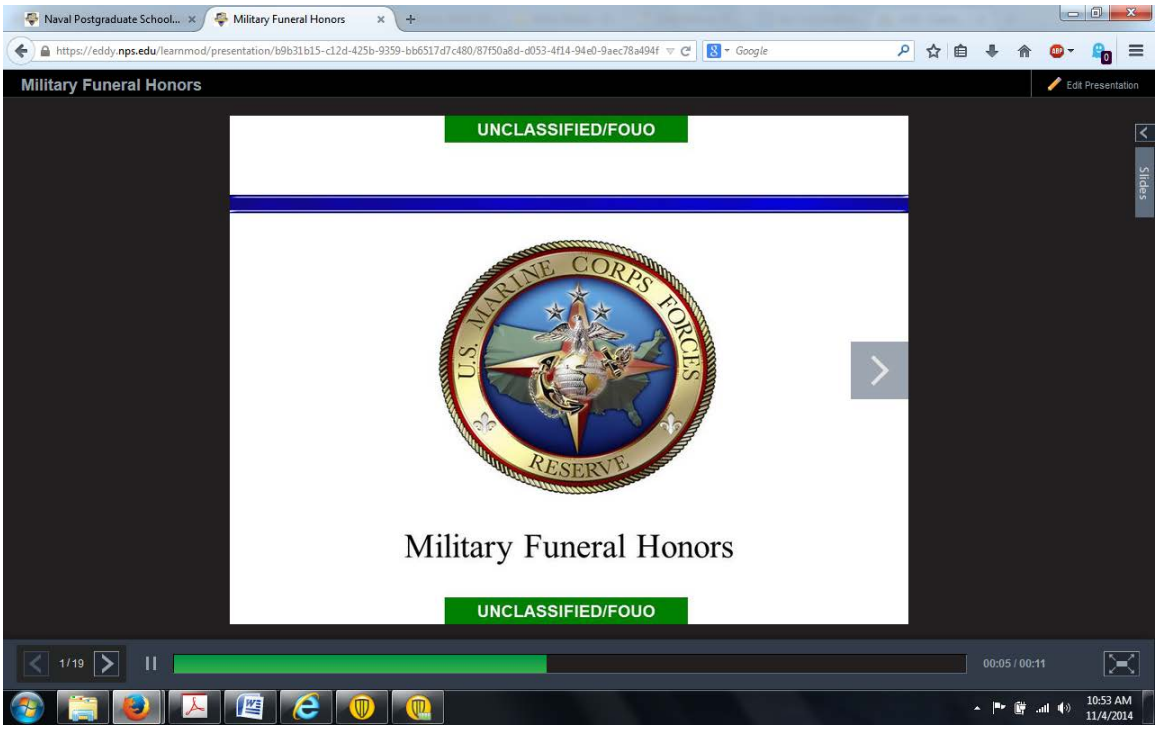

Figure 10 Narrated Slide - Funeral Honors

Review questions for each module are developed through collaboration between the PI, IKM, PM and SMEs. The idea is to cover the terminal learning objectives (TLOs) and key enabling learning objectives (ELOs) through a variety of student interactions (e.g., True/False, multiple choice, completion). Figure 11 shows a screenshot with three learning checks within the Funeral Honors module. All three such review questions take the multiple choice format in this module.

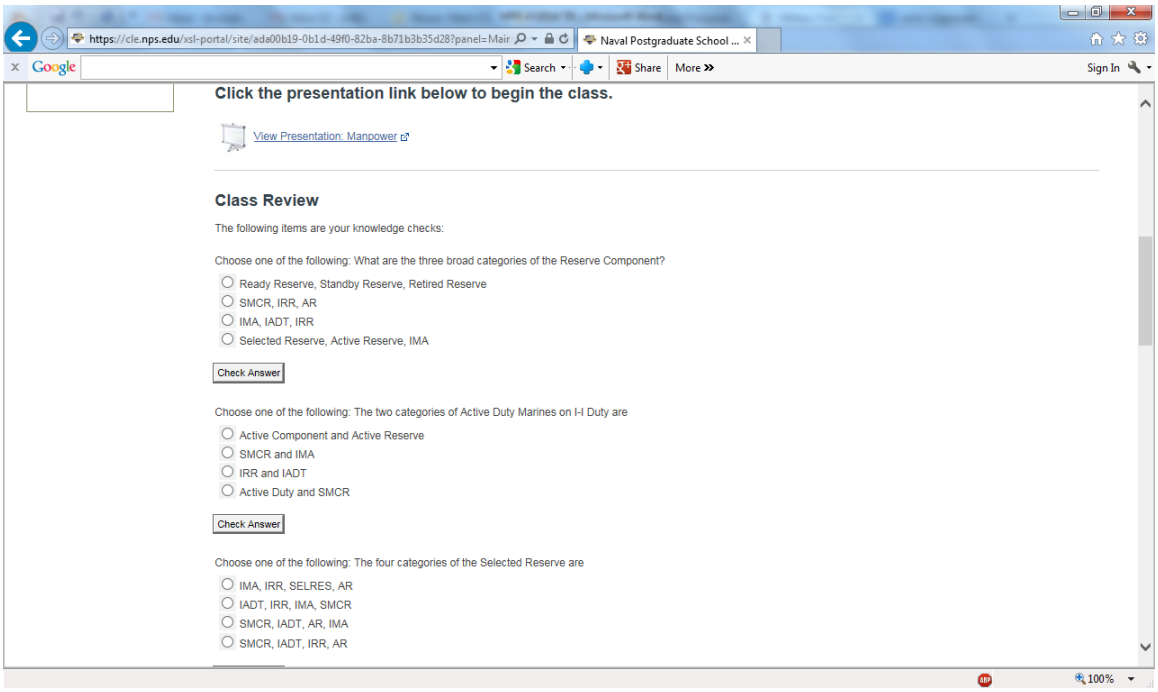

Figure 11 Learning Checks - Funeral Honors

A list of references for the Funeral Honors module is shown in the screenshot of Figure 12. These refer to more detailed information that an I-I student can consult while taking the course, and they represent important sources of review that the I-I can consult while on the job. This dual nature of the online modules (i.e., supporting both initial training and ongoing reference) is powerful. The figure also shows a section for students to submit requests for information (RFIs) to SMEs, instructors and other knowledgeable people. This serves to substitute in part for the students' inability to ask questions during the SME slideshow presentations (e.g., where opportunities permit during the Annual I-I Training Conference).

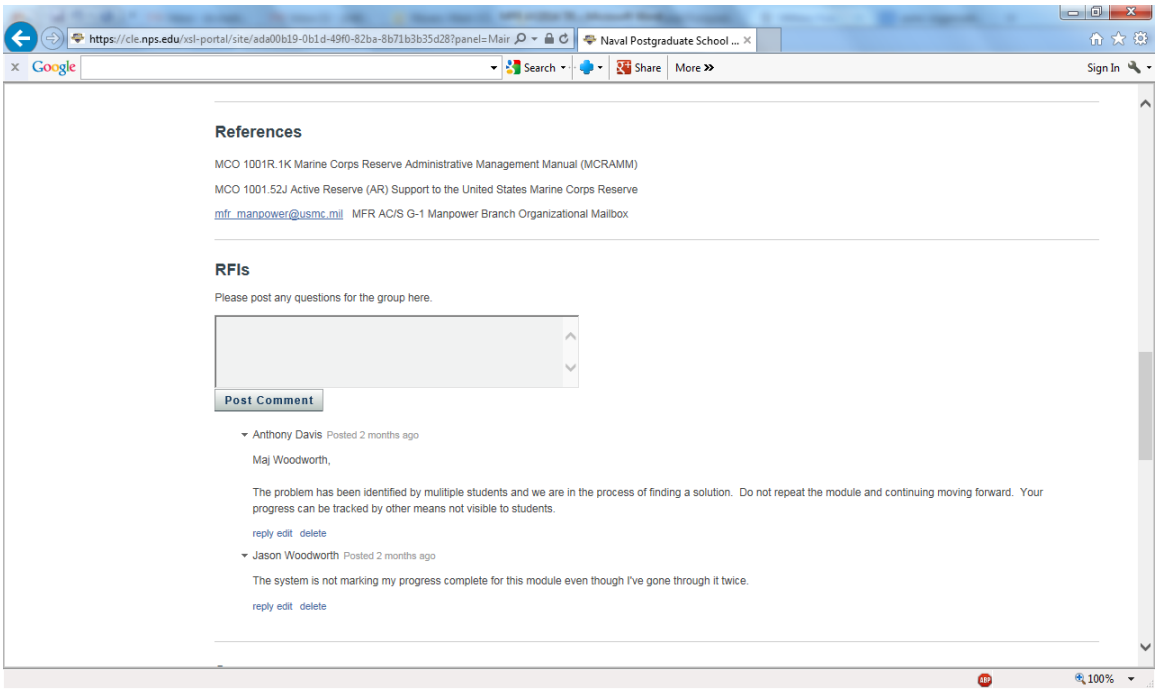

Figure 12 References and RFI - Funeral Honors

Additionally, each module includes two other standard features. One is a confined survey asking simply whether each student finds the material presented in that module to be useful or not. The other is an open ended comment box, in which students are encouraged to recommend course and module improvements. These features are evident in the screenshot presented in Figure 13 for the Funeral Honors module.

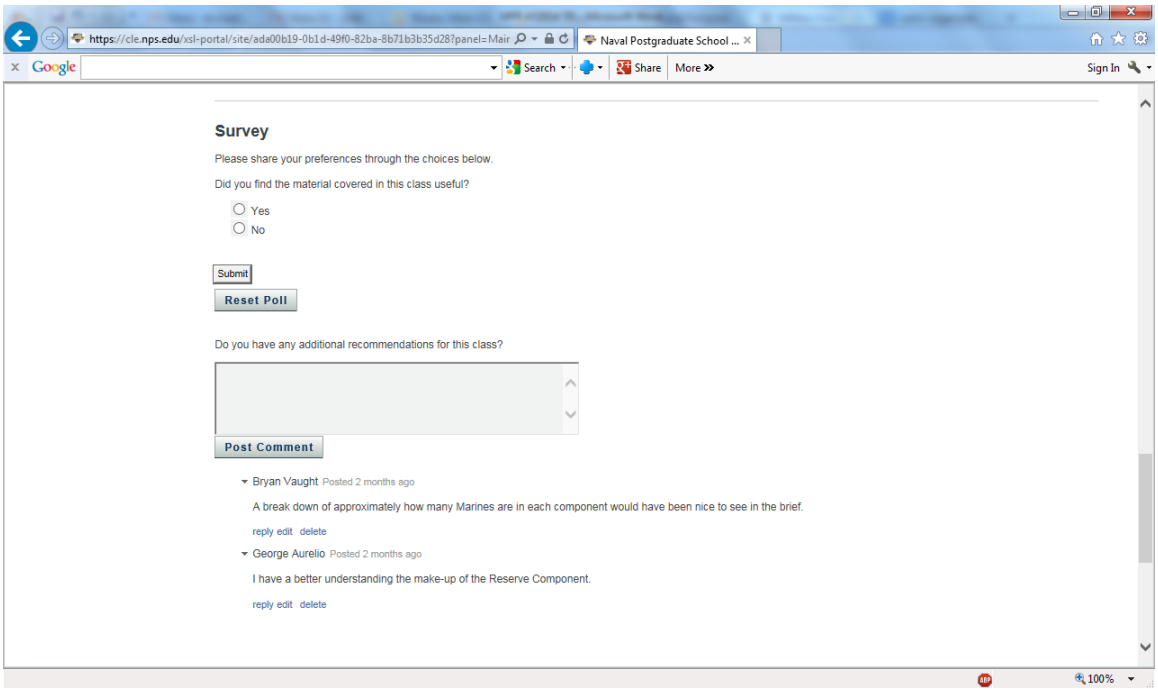

Figure 13 Survey and Comment - Funeral Honors

b. Joint Prototyping

The second step of joint development follows this proof of concept effort. After prototyping a course module along these lines, the PI and IKM both assume a "student" role and complete the module learning activities through a variation of alpha testing. We then invite two SMEs to accompany the IKM and PM for a multiday, hands-on workshop at the university. Here the SMEs complete the prototype module through additional alpha testing. Issues, problems, mistakes and refinements are incorporated into the prototype module, and then we teach the IKM, PM and SMEs to develop their own modules. "Teaching people to fish, instead of just given them fish," is the aphorism that captures our approach well. At the end of this workshop, we have five people able to develop course modules, and we have the IKM able to teach others to do so, locally at MFR Headquarters.

c. SME Course Development

This joint prototyping step results in the development of five course modules, which are reviewed with MFR leadership. The leadership imparts some additional comments, suggestions, refinements and demands, which are

incorporated and prepared to review with the large group of SMEs at MFR Headquarters. Such review begins the third step of SME course development, and the IKM helps the large group of SMEs to develop the 40+ remaining modules required for the online I-I training course as a whole.

As above, all modules adhere to a common format, and as one looks through the diverse modules on the Sakai site, they all share a consistent and comfortable look and feel. All module prototypes are completed within a relatively short period of time, after which the PI and IKM attend to course administration, and the PM arranges for implementation of the online modules in advance of the next Annual I-I Training Conference.

In terms of administration, we set up features to enroll I-I students, track their progress, score their online exams (required for completion and certification), issue completion certificates, and attend to other important aspects such as viewing statistics to summarize which students have accessed the system.

C. IMPLEMENTATION

Implementation refers to results collected to date regarding the online I-I training course and the Annual I-I Training Conference. As the SMEs complete their 50 or so I-I course modules, each module is subjected to an internal quality review (e.g., by SMEs) and alpha tested (e.g., by the PI, IKM, PM). Due in great part to our pedagogically suitable course design, standard module layout, and course development coaching, all of the modules emerge—through iterative development and testing—with good quality. Although they remain a bit rough—as one would expect for prototypes ready for beta testing—the modules appear suitable for distribution to students in advance of the 2014 Annual I-I Training Conference. The MFR leadership agrees and authorizes the course modules to go "live," even in beta version, and be used for this year's annual I-I training.

A total of 253 people have used the course site. This includes 11 listed as Instructor, 68 as Observer and 174 as Student. Speaking roughly, "Instructor" corresponds to course developers (e.g., the PI, IKM & PM) and support staff members (e.g., NPS instruction designers), "Observer" corresponds to SME module developers, and "Student" corresponds to I-Is completing the course modules. Students generated 909

of the 2301 total site visits. Most such visits took place in advance of the Annual I-I Training Conference, but several students have visited the site since after the conference ended, suggesting that I-Is are beginning to utilize the site as an ongoing resource after course completion. This coincides with a longer term objective for the course site and is encouraging to see so soon. Alternatively, of the 253 registered users, 56 have never logged onto the site. This unexpected result requires further investigation.

Informal information received from the I-I students indicates overwhelming support for the direction that the course is taking through our asynchronous training modules, understanding of course that our release of what is effectively a beta version contained several "bugs" to be fixed in the next iteration. Informal information received from the MFR leadership is overwhelmingly positive also, with a number of leaders expressing some degree of surprise that the offering was so successful. The MFR IKM, PM, SMEs and leadership all share credit for such success with their NPS project teammates.

The MFR leadership makes another decision regarding the course: it is used to *augment* not *replace* the annual conference. Although the online I-I course replicates the content of conventional conferences in the past—and obviates the need for I-Is to participate in the conference—by having students complete the online training *in advance* of participating in the conference, we seize the opportunity to redesign the conference itself. Now, instead of attempting to train I-Is through a multiday battery of presentation slideshows, such training is accomplished in advance of the conference, and conference organizers are able to utilize students' and SMEs' time together for different purposes. In particular, greater I-I community interaction is made possible, which represents an important aspect of community building and accelerating tacit knowledge flows.

Notwithstanding these advantages, however, development of the course modules by SMEs pushed nearly into the conference itself, and the MFR organization lacked sufficient time to redesign the conference to the extent enabled by our asynchronous training modules. Hence they were unable to take full advantage of the capabilities enabled through this project work in 2014. Plans are in place now, however, to fully leverage such capabilities in 2015.

Further, SMEs were instructed to modify their conference sessions in order to avoid using the exact same presentation slideshows contained within the online modules. Toward this end, several of them used their conference sessions to great effect and with impressive creativity. One SME, for instance, organized the entire training conference session (e.g., the hour allocated to that module) into a question and answer opportunity, drawing appropriately from training slides to help answer students' questions and to help reinforce the training concepts. With considerable additional time available in advance of the 2015 conference, we expect to see even more effective and creative use of I-Is' time together in New Orleans.

V. CONCLUSION

It is difficult to find an organization that is *not* interested in competitive advantage in today's dynamic, global, highly competitive environment. Of the myriad different approaches to attaining and retaining competitive advantage, most scholars agree that *knowledge* is key: knowledge enables effective action; effective action drives superior performance; and superior performance supports competitive advantage. As such, organizations able to move dynamic knowledge quickly can outperform their rivals, peers and counterparts. Plus, once they attain a knowledge-based competitive advantage, many organizations are able to retain—and even expand—such advantage over time. Hence knowledge retains a special role in organization performance, mission success and competitive advantage.

The US Marine Corps is clearly a knowledge organization. Its longstanding efficacy—in combat and other domains—centers in greater part on dynamic knowledge gained through training, experience and doctrine than the weapons and other materiel employed. Further, the incessant rotation and turnover of its personnel exacerbate the need for rapid knowledge movement. Marines are deployed, stationed and relocated all around the world, and they must learn to perform effectively—as individuals, teams and coherent forces in expeditionary, joint and coalition operations—even before hitting the ground, often in circumstances precluding advance training or even face-to-face interaction.

Information technology plays a common role in attempts to enhance the performance of knowledge organizations. However, as evident from the term, *IT* addresses principally *information*, not *knowledge*, and IT alone is clearly inadequate to sustain knowledge-based competitive advantage. Hence information technology must be employed deftly—in conjunction with knowledge management principles, methods and techniques—in order to realize the performance benefits of dynamic knowledge for organization performance and competitive advantage.

Such deft employment of IT describes our approach to accelerating dynamic knowledge through Marine Corps organizations. In this research project we identify Marine Forces Reserve (MFR) as an organization exemplifying the need for rapid

knowledge movement. Marine Corps Reserve units must be ready always to augment and reinforce the active component across the entire spectrum of military operations around the world, and they take pride in maintaining trained and experienced Marines.

A key component to the success of the Marine Corps Reserve is the knowledge of Active Duty Inspector-Instructors (I-Is). Each of the 120 Reserve Centers is staffed by a cadre of active duty Marines, who play key training, inspection, administration, support and other roles. All of these roles require considerable and diverse knowledge to perform effectively, but many I-Is arrive with no prior training or experience working with the unique and dynamic challenges of the Reserves. Nonetheless, they must take charge quickly, even though extant knowledge flows are relegated principally to questionably effective presentation ('Death by PowerPoint') slideshows and error-prone on the job training.

Moreover, the I-I Marines are distributed all across the continent and required to perform their roles without the nearby support of adjacent units and higher headquarters (e.g., in some cases, only a single I-I can be found at a particular reserve location). Compounding such challenges from the tyranny of distance and isolation, the Reserve component presents unique business processes, requirements and legalities about which incoming I-Is have negligible opportunities for advance or rapid learning.

In short, the active duty I-I role is crucial to the success of the Reserves, but Marines serving in such role are not effectively onboarded and equipped with the essential sources of job knowledge. This marks the I-I role as both important and challenging in terms of moving knowledge effectively. Hence we target such I-I role as the focus of this study.

Leveraging deftly the power of IT—and understanding critically the inherent inefficacy of IT absent direct attention to the key knowledge underlying competent job performance—we first examine the dynamics of knowledge required to enable I-I personnel to perform effectively. Conducting a case study of MFR as our focal organization, we employ multiple techniques for data collection in the field, including document review, interview, participant observation and prototyping.

The knowledge of experienced professionals at MFR Headquarters emerges as key in this light, as we identify and interact with subject matter experts (SMEs) across

most key areas encompassing the I-I knowledgebase. We glean from such SMEs not only what knowledge is key and how it flows today, but also important constraints and limitations impeding current I-I knowledge flows. Geographical distribution, limited peer interaction, isolation from Headquarters' expertise, persistent job rotation, budget constraints and infrequent training opportunities all contribute to the knowledge flow issues.

Our study proceeds through three phases: 1) knowledge flow analysis, 2) prototyping, and 3) implementation. In the first phase of knowledge flow analysis, we learn to understand the dynamics of I-I knowledge, with particular attention to initial training and ongoing experience. These results are informed principally by our document review, interview and participant observation data collection efforts, and we identify and classify roughly 50 key areas of I-I knowledge for closer scrutiny. We further analyze in considerable depth the two principal organization processes driving knowledge flows at present (i.e., presentation slideshows, on the job training), delineating their dynamics across five dimensions and—as we draw from Knowledge Flow Theory and knowledge management principles—identifying promising interventions with good potential to accelerate such flows and to increase I-I performance in the field.

For two instances, we outline how to enhance the presentation slideshow knowledge flow by increasing the pedagogic efficacy of I-I training—for example through a more effective training course—and we prescribe how to increase the efficiency of the current presentation slideshow knowledge flow by obviating the need for I-Is to gather physically for the Annual Training Conference—for example through a distributed training course.

Drawing additionally from KFT and knowledge management principles, we outline interventions to accelerate the tacit learning associated with OJT also. For two instances, we outline how the I-I community can be enhanced to facilitate peer mentoring between diverse I-Is stationed at various reserve centers across the country—for example through community building activities to help individual I-Is meet, get to know, and learn to trust and seek assistance from one another—and we prescribe how MFR SMEs can spend an increased portion of their work days mentoring and coaching individual I-Is—for example through mentoring and coaching at their respective reserve centers.

In the second phase of prototyping, we employ system design, development and testing methods to the use of asynchronous learning technologies to enhance the I-I training knowledge flows. We assemble an excellent team; devise a pragmatic, rapid iterative prototyping approach; and proceed to develop, test and implement a prototype set of online I-I course modules for training. Beginning with a single proof of concept course module that exhibits a pedagogically sound set of learning activities, we refine such module and agree jointly that every course module should follow a standard five section format (i.e., introduction, narrated presentation slides, review questions, references, information request).

Then we teach multiple MFR SMEs to develop their own modules. “Teaching people to fish, instead of just given them fish,” is the aphorism that captures our approach well. In the end, the IKM and G3 PM help a large group of SMEs to develop the roughly 50 modules required for the online I-I training course as a whole. All modules adhere to a common format, and as one looks through the diverse modules on the Sakai site, they all share a consistent and comfortable look and feel. All module prototypes are completed within a relatively short period of time, after which the PI and IKM attend to course administration, and the PM arranges for implementation of the online modules in advance of the next Annual I-I Training Conference.

The MFR leadership makes an important decision regarding the course: it is used to *augment* not *replace* the annual conference. Although the online I-I course replicates the content of the Annual I-I Training Conference—and obviates the need for I-Is to participate physically in the conference—by having students complete the online training *in advance* of participating in the conference, we seize the opportunity to redesign the conference itself. Now, instead of attempting to train I-Is through a multiday battery of presentation slideshows, such training is accomplished in advance of the conference, and conference organizers are able to utilize students’ and SMEs’ time together for different purposes. In particular, greater I-I community interaction is made possible, which represents an important aspect of community building and accelerating tacit knowledge flows.

Although results are only just beginning to appear, we’ve identified the potential for huge return on investment in terms of cost, and early indications suggest that training

efficacy is as or more effective than accomplished through previous methods. Further, our “teaching people to fish” approach has equipped the MFR organization with an organic capability to leverage the results of this work and accelerate other key knowledge flows. This sets the stage to leverage the success of our current project to address other MFR training needs, and the approach offers potential for migration to other Marine Corps organizations.

The MFR leadership made a wise decision to pursue this research study. Results are paying off already, and the potential for continued return on investment appears huge. The MFR organization has demonstrated that it can replace expensive and marginally effective presentation slideshows with effective online training modules, and it has appropriated the knowledge required to design, develop, implement and administer such modules itself. Thus, MFR possesses the ability to leverage its investment in additional training courses—extending broadly across the range of distributed training needs—and it maintains excellent working relationships with experts at the Naval Postgraduate School to help continue improving the pedagogy of its courses—pushing deeply into course redesign.

Both the broad and deep approaches are highly promising, but budget constraints are likely to limit the organization’s ability to pursue both simultaneously. Our recommendation is for MFR to pursue the breadth approach first, leveraging its success with accelerating knowledge flows to other training needs. This is likely to set MFR up to showcase its incisive leadership and wise investment, hence becoming a model for the Marine Corps at large.

Further, as we gain knowledge from and experience with such broad array of pedagogically rich online training courses, patterns of excellence across diverse courses are likely to emerge, and MFR instructors will become increasingly familiar and proficient with online pedagogy, which will signal an excellent time to commence pushing deeply into course redesign. Where individual course idiosyncrasies make sense, we can maintain them, but where best instruction design practice can be standardized, we can implement it as instructional doctrine. The future is exciting. We’re all looking forward to helping to make it happen.

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