

**Analysis of the Knowledge Management Process in Multinational
Experiment 3**

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Abstract

This paper presents the analysis of the Knowledge Management (KM) process in the US Joint Forces Command (JFCOM) Multinational Experiment 3 (MNE 3). Joint Forces Command's J9 Joint Experimentation in Suffolk Virginia hosted this event with participation by Australia, Canada, France, Germany, the United Kingdom and NATO. The objective of the experiment was to explore an emerging joint concept called Effects Based Planning (EBP) within a coalition environment. A Coalition Task Force Headquarters (CTFHQ) and a NATO Response Force (NRF) headquarters were created based upon JFCOM's Standing Joint Force Headquarters (SJFHQ) concept. This included the implementation of a Collaborative Information Environment (CIE), which is a key element of the SJFHQ that enables it to function from a knowledge-centric perspective. The technology and the concept of operations for the CIE were important elements of the KM process in this experiment. This paper describes the design of the experiment with respect to KM, presents the analysis of observations and data collected through surveys, provides recommendations for improving KM in a CTFHQ, and outlines how the findings and recommendations from MNE 3 could be used in the design of a Limited Objective Experiment on KM.

Introduction

The U.S. Joint Forces Command's Multinational Experiment 3 (MNE 3) was hosted by Joint Forces Command's J9 Joint Experimentation in Suffolk Virginia with participation by Australia, Canada, France, Germany, the United Kingdom and NATO. The purpose of the experiment was to explore an emerging joint concept called Effects Based Planning, or EBP, within a coalition environment. U.S. Joint Forces Command's EBP concept has two important supporting concepts; the Standing Joint Force Headquarters (SJFHQ) concept and the Collaborative Information Environment (CIE) concept. The SJFHQ concept shaped the experiment design significantly as it provided the template for the design of the Coalition Task Force Headquarters (CTFHQ) and a NATO Response Force (NRF) Headquarters. The CIE concept also had an important impact on the experiment. Under this concept, the technologies supporting distributed collaborative planning and multinational information sharing were implemented. The CTFHQ and the NRF HQ were linked over the Combined Federated Battle Lab (CFBL) network.

Knowledge Management (KM) had two dimensions in MNE 3. KM is a component of the SJFHQ organization, along with Plans, Operations and Information Superiority. This organization is depicted in Figure 1. KM is also an activity; one that is integral to the concept of operation of the CIE. The CIE is a key element of the SJFHQ that enables the headquarters to function from a knowledge-centric perspective. The organization of information in the CIE and the concept of operation for the KM team as a

component of the headquarters are therefore key features of the experiment. The effectiveness of these two dimensions of KM was examined as part of the analysis of MNE 3. This paper describes the design of the experiment with respect to KM, presents the results of the analysis, provides recommendations for improving KM in the SJFHQ, and outlines how the findings and recommendations from MNE 3 could be used in the design of a Limited Objective Experiment on KM.

Experiment Design for Knowledge Management

The MNE 3 was a large event conducted over the CFBL with participants located in several countries and a wide range of time zones. Using a distributed coalition headquarters construct with an operational planning task and a NATO headquarters with the same task, the experiment supported three objectives:

1. To develop and assess processes to support EBP;
2. To develop and assess organizations to support EBP; and
3. To identify technology requirements to support EBP.

The SJFHQ concept was used to design the CFTHQ and the NRF headquarters used in MNE 3. The basic structure of the SJFHQ is shown in Figure 1 with a Command Group supported by Plans, Operations (Ops), Information Superiority (IS) and KM sections or teams. Two additional sections associated with the headquarters for the experiment were the Coalition Interagency Coordination Group (CIACG) and System of System Analysis (SOSA). Three Knowledge Management Officers (KMOs) were tasked as matrix support to the Plans, Operations, and IS sections. There was also a KMO in support of the CIACG. The KM Chief was responsible for coordinating the headquarters-wide KM vision and for directing KM operations as well personally providing support to the CTFHQ Commander and the Command Group.

The KM Chief was also responsible for maintaining a full awareness of the CTFHQ's knowledge and information management requirements and possessed the authority to coordinate actions and processes to satisfy essential information needs. It was part of the KM section's mandate to organize the information in the CIE and then, through the KMOs, provide guidance to members of the headquarters for locating information required to conduct tasks. The KM section was also responsible for providing technical support to the headquarters, including the networks. The size and composition of the KM Team is shown in the organization chart in Figure 2.

The Coalition Knowledge Information Management Plan (CKIMP) describes the CIE as,

“ ... oriented toward developing situational awareness and understanding of the battlespace (pre-crisis, developing crisis, and during crisis response) to assist the commander and his staff in the decision making process.”¹

Furthermore the CIE will,

¹ Reference 1

“ ... comprise infrastructure, tools, distributed participants (people & organizations with specific and required subject matter expertise) and the enabling processes and procedures”¹

and,

“ ... will serve as both the primary operational command and control system for the AOR but also as the pre-crisis planning and knowledge base system for the command.”¹



Figure 1: Structure of the conceptual SJFHQ with adaptations for MNE 3.

The CIE in MNE 3 contained a range of capabilities including an information portal, a database designed specifically to support the EBP information requirements, a map warehouse, a web-based Common Operational Picture (WEBCOP) displaying tracks generated by a federation of simulations, and a collaboration tool called Information Work Space (IWS). The information portal provided an interface for each section in the HQ through which documents (primarily MS Word, MS PowerPoint, MS Excel, and PDF files) could be accessed. The critical task for the KM team during the preparations for the experiment was the design of these interfaces in order to provide the knowledge base described in the CKIMP [Ref 2] in a manner that enhanced situational awareness.

¹ Reference 1

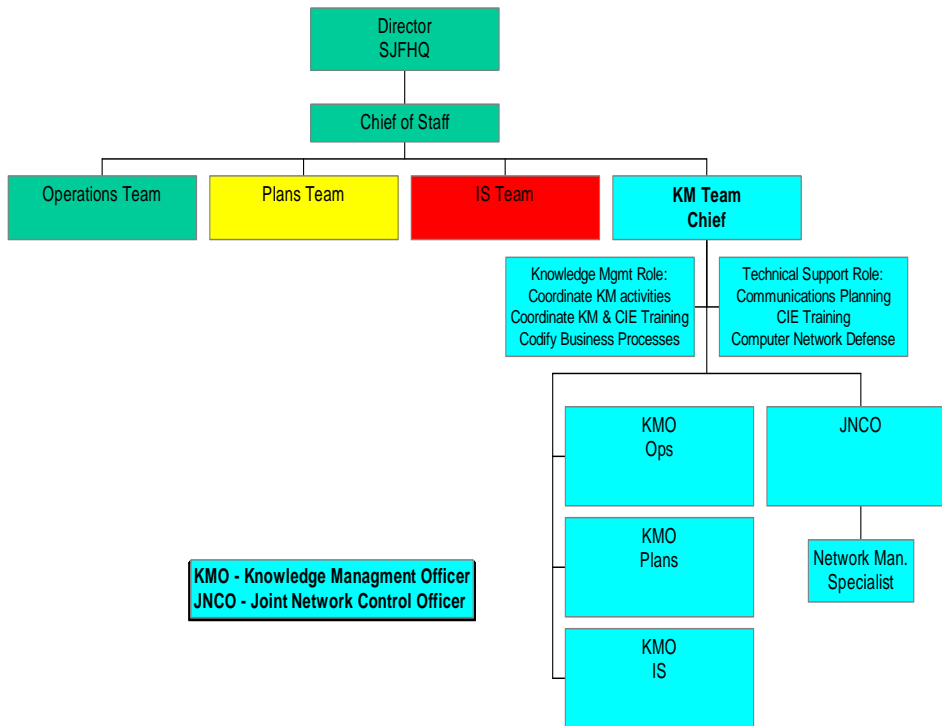


Figure 2: A CTFHQ organization chart with an expanded view of the KM team’s members and roles.

KM in the context of this experiment is described quite aptly in the following statement from the CKIMP:

“Knowledge Management (KM) includes all processes involved in the creation, receipt, collection, control, dissemination, storage, retrieval, protection, and disposition of information. KM also includes processes used to organize information and determine its applicability to a specific person, element or larger process.”²

The mission of the KM team in the headquarters was to ensure the best information was available when needed by Commanders and staffs as they executed command and control. A key KM principle within the CIE concept is that all personnel are knowledge and information managers and that each has responsibilities to participate in the acquisition, assessment, review, correlation, fusion, categorization, and dissemination of quality information to other users.

The analysis of KM in this experiment was conducted to support the three objectives; process, organization and technology. The size, role and effectiveness of the KM team was examined through the observations and questionnaires. The design of the portal and the effectiveness of the technology were assessed primarily through data collected by questionnaire. One important concern in the analysis was that there were

² Reference 1

differences between the CTFHQ and the NRF headquarters but there was no means for KM observation at the NRF headquarters during the experiment.

Experiment Conduct

The experiment was performed with the CTFHQ as a distributed headquarters. The Command Group was located at the main site at the US JFCOM Joint Experimentation facilities in Suffolk VA. Members of the other teams in the CTFHQ were distributed at sites in all of the participating nations. The NRF HQ staff was collocated at a site in Germany. The task was to conduct operational level mission planning using the EBP process, the scenario was based upon the ISAF mission in Afghanistan. The primary tools were the information portal and the IWS. These two tools provided the participants with the capability to share information and means to conduct briefings and meetings online.

Different groups from the headquarters staff conducted the planning activities in the EBP process each day through a series of briefings and meetings. These groups were identified as Boards, Centres or Cells and were organized using a daily battle rhythm. Members of the Plans, Ops, IS, and KM teams were assigned to attend various Boards, Centres or Cells in order to conduct the various tasks in the headquarters. The EBP process designed for MNE 3 had thirteen steps with a variety of tasks in each step. The daily assignments of the Boards, Centres and Cells were designed to progress the headquarters through the planning process producing an effects based tasking order at the conclusion of the event. The primary activity in the experiment therefore was online meetings to collaborate and develop plans.

The KM Team attended key meetings within the virtual CTFHQ as well as the NRF headquarters and provided technical assistance but more importantly tried to guide Plans, Ops and IS to the information resources within the CIE. The other significant activity for this group was regular KM meetings to discuss and progress the KM process. This was in keeping with the first priority objective of MNE 3, which was to develop the EBP Process. These meetings led to recommendations for changes to the mandate and size the team as well as the roles of the members. These are important observations from the experiment that are included in the conclusions and recommendations.

Analysis

The primary source of information for the analysis of the KM process, organization and technology in the experiment was the questionnaires. The analysis team used the IWS to observe all KM meetings and, where possible, attend the planning meetings where KM had a role. These observations were used to confirm the findings from the analysis of the survey data. The observations and recommendations of the KM team, products of their meetings on process, were also considered and are presented in this section of the paper.

The questionnaires were distributed through a web-based application that stored the responses in a central database. The database was queried by the analysts to retrieve and sort responses and then prepare statistics. Three questionnaires containing nine questions were administered. There were a total of 74 respondents, 14 KM staff and 60 other HQ staff. The collected data was analysed by reviewing text records, deriving statistics where appropriate, and in one case employing “content-based” analysis. The findings were compared to observations made during the conduct of the experiment.

The first questionnaire was for the KM staff and had four questions. All of the questions were text responses based upon a basic Yes/No with an explanation. The answers were categorized by the analyst using three options: Yes, No, or a Null response. A Null response was assigned where the respondent did not have a position on the question or the comments were unclear. The first question asked; “*Did the CIE portal structure support your EBP customer's requirements?*” The results from the Yes/No responses are shown in Figure 2. Half of the KM staff felt the structure did support the user’s requirements and the remainder were split between Null and No responses. The finding on this question was that the KM staff did feel that the portal structure supported the customer’s requirements.

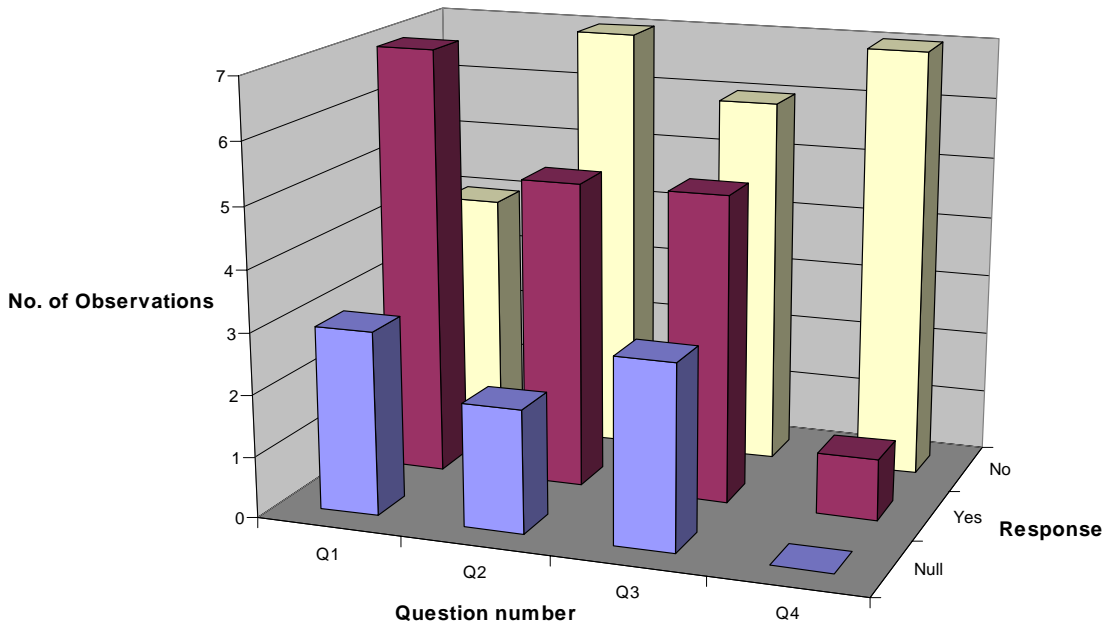


Figure 2: Responses from the 14 members of the KM Teams (in the CTFHQ and NRF headquarters) to the four questions in the first questionnaire. Note that only the 8 members of the CTFHQ team answered the fourth question.

The second question asked: “*Were requirements from your EBP customers within the scope of KM capabilities? Did your EBP customers ask you to provide products that KM could not provide?*” The results in Figure 2 are based primarily on the response to the first query. The reactions were fairly split, so the finding from this question, after reviewing the comments, was that the KM staff did not feel they could satisfy the users requirements and that customers were requesting products that could not be provided.

The third question asked: “*Did KM receive adequately defined requirements from its customers?*” Given that the answers to the Yes/No were again fairly evenly split (shown in Figure 2) it was the respondents’ comments that decided the issue. The KM staff discussed the general KM requirements in the headquarters rather than their customers’ requirements. Their responses were useful but not quite to the point. Hence there was no finding for this question.

The fourth question asked: “*Was the Coalition Knowledge Information Management Board (CKIMB) able to coordinate requirements from different customers to provide consolidated solutions? Did KM have to satisfy customer requirements piecemeal or could KM come up with smart solutions that satisfied everybody?*” The CKIMB was the meeting the KM staff convened daily to manage the requests for information. The second question is a reference to consolidated RFI (request for information) management that deals with information requests in a synergistic manner. The NRF headquarters did not have a Knowledge Information Management Board, so there were only 8 responses.

The answer was a clear No. This was primarily because the CKIMB was not really used to review the various knowledge requests each day. There did not seem to be either sufficient requests or sufficient staff. While it was probably both factors, it was clear that the Board did not perform this task. Under the circumstances, this was considered a non-test. If the CKIMB was never really used, then the proper test data to measure if KM could meet the requirements for EBP or provide consolidated answers was not available.

The second questionnaire was for the rest of the players, 60 in total with 20 in the NATO HQ. Again there were four questions; two questions were designed for responses on a scale of 1 to 7 (from strongly disagree to strongly agree) and the other two were text responses. The third question was based upon Yes/No and an explanation. For this question, the answers were categorized by the analyst using three options: Yes, No, or a Null response. The fourth question requested the identification of a step in the EBP process. A rank analysis was performed on the responses to this question.

The first question tested the following statement: “*KM provided simple and logical access to information you needed to do your job.*” The responses are displayed in Figure 3. The distribution indicated that on average, the group was almost neutral in their responses with a slight preference to disagree. The comments from the participants, both positive and negative, provided useful feedback for improving the portal. Problems were

identified with the RFI process, the interface, the organization of the information in the portal pages, and the structure and “navigate-ability” of the portal.

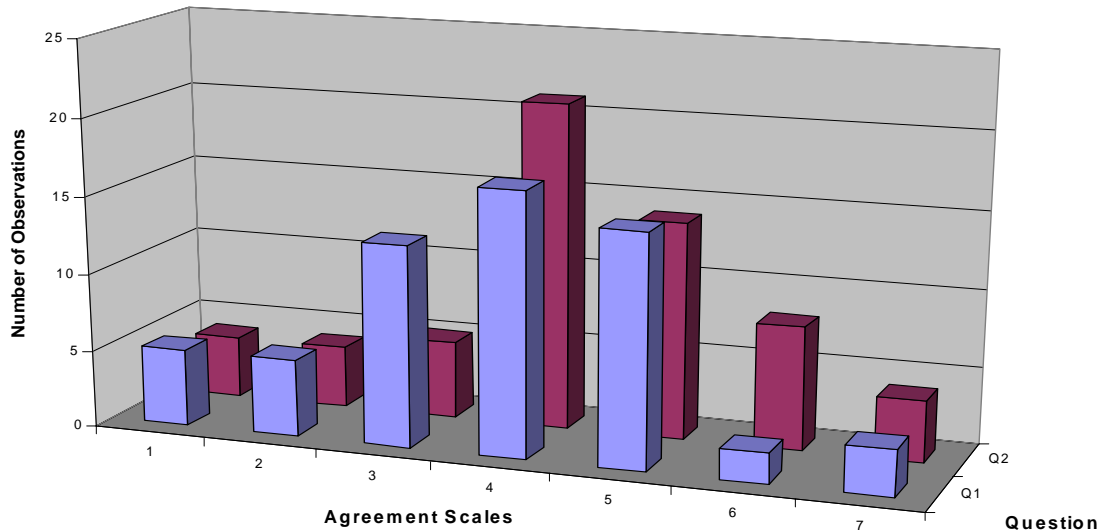


Figure 3: Distribution of the responses from 60 headquarters staff to the agreement scales for the first two questions of the second questionnaire (from 1 for strongly disagree to 7 for strongly agree).

The second question tested the following statement: “*KM representatives were proactive in identifying and satisfying your information needs.*” Again, the distribution of the responses indicated that on average, the group was almost neutral with but with a preference to agree, see Figure 3. The participants had many positive comments for the KM staff, but sometimes felt the experiment was not working that well when it came to KM. They felt that the KM team was often under-resourced for the assigned tasks, but always very helpful and responsive.

The third question asked the following: “*Was the KM process responsive to dynamic and changing requirements of the EBP process?*” The players indicated fairly clearly that they thought the KM Process was responsive to the situation and met the requirements of the EBP process. The results showed 31 participants said Yes while 20 said No. There were 9 Null responses. Overall, there were not many comments on this question, but those that were offered indicated that the situation probably was not that dynamic.

The fourth question asked the following: “*During what steps in the EBP process was KM most valuable and effective? How could it be improved?*” The steps in the EBP process are not explained in this paper, Reference 3 may be consulted for explanation of the process that was designed for MNE 3. Eleven of the thirteen steps in the EBP process were performed in the experiment and the responses identified six for which KM provided utility; Commander’s Initial Guidance (Cdr Ini Guide), Mission Analysis (MA),

Effects Analysis (EA), Action Risk Assessment (AA), Course of Action/Wargaming (COA/WG), and Synchronization (Sync).

Although many participants offered feedback on how KM could be improved, only 25% of responses provided answers that could be related to particular steps in the EBP process. A rank analysis was performed on the occurrence of EBP steps in the text responses. Participants mentioned up to four steps in some cases. Effects assessment, action risk assessment and mission analysis were the top three ranked steps, as shown in Figure 4.

It is important to note in interpreting the data for the fourth question that in the experiment more time was spent on the early steps in the process. These were also the steps that relied the most on the database prepared for the scenario, which contained information on social, economic, infrastructure, political, military and information systems and capabilities. The ranking results correspond to these steps. The finding for this question on process was that KM was probably valuable and effective for the process steps identified, but that appropriate responses are required from a larger portion of the experiment audience to be definitive.

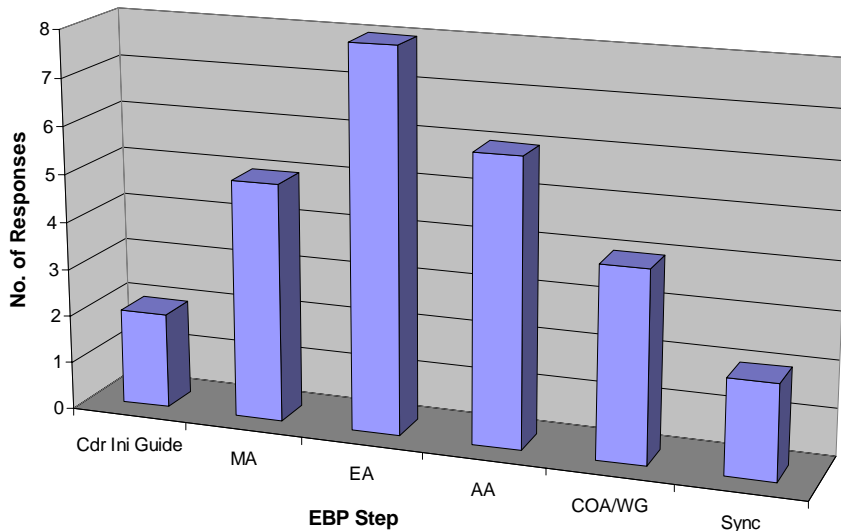


Figure 4: Distribution from the rank analysis of the responses of 60 headquarters staff to the question on the value and effectiveness of KM in the EBP process steps.

The third questionnaire was given to all 74 participants, including 26 staff from NATO. There was one question requiring a text response. A content-based analysis was performed upon the responses. The question stated: “*Based on your experience in the experiment, what changes would you make to the KM process?*” An iterative process was employed whereby the responses were reviewed and the categories were assigned until a satisfactory category list developed. The list with a brief explanation of each category is given below:

- RFI – improving the RFI process, or attention to CCIR;

- Push-Pull – comments regarding the implementation of either information Push or information Pull (or both) in a portal
- Edu & Trg – Education and training
- Org – Organization
- Interface – comments critical of the interface or related functions
- HR – comments calling for more KM staff
- KM Req – comments calling for definition of KM Process Requirements including development of better process for EBP and ONA

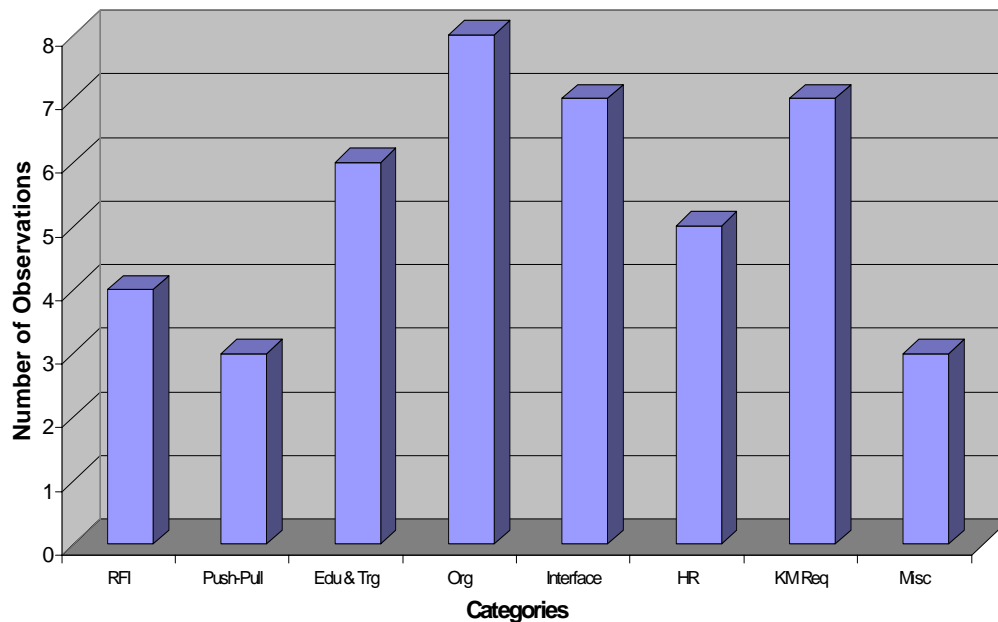


Figure 5: Results of a content-based analysis of the responses from the 74 participants in the two headquarters to the third questionnaire identifying changes that should be made to the KM process.

Many responses did not address the question clearly to the point that 29 were categorised as Null. Regardless, a large number of detailed comments were provided. As can be seen in Figure 5, there was a relatively even distribution of responses across the eight categories. Organization, Interface and KM Process Requirements were the leading categories. Sample comments from these categories are paraphrased below:

- **Organization:** *Need a complete new structure, taking the specific needs of the committees and teams with the CFTHQ into consideration.*
- **Interface:** *Information in the portal is not always visible to those who need to know; information pull does not give them effective access.*
- **KM Process Requirements:** *KM staff should work directly with planners on the products the latter produce in order to give the entire HQ a quick and easy access to all documents created in the EBP process.*

This question generated excellent feedback on different features of the experiment from a significant portion of the experiment audience. This is probably more important than knowing which issues were most significant.

The KM team met once each day during the experiment to assess the impact of their activities, examine strategies to improve the KM process during the current experiment, and to prepare recommendations to improve KM in the next experiment. The KM Chief's observations from these meetings are summarized in the following paragraphs. While some of this material takes the form of recommendations from the KM team, it is presented as additional observations within this paper.

The KM Team did not have the staff or knowledge base to meet its mission. The KM matrix support, which was mostly IM/IT, improved the efficiency of the other sections but did not improve the commander's cross-functional knowledge requirements. What was missing within the CIE was a human KM layer responsible and capable to create a symbiosis between the processes, the technologies and the human resources to produce actionable knowledge in relation to the Commander's mission. Such a team would have situational awareness of all the elements critical to the creation of actionable knowledge and the capability to dynamically modify these elements behaviour to optimize knowledge readiness in relation to the Commander's mission.

The KM team should be responsible for the planning and management of the knowledge system of systems (SoS) architecture relevant to the Commander's mission. This architecture should ensure an effective integration between what constitutes the information, the cognitive and the physical domains. This architecture should not only consider knowledge within the CTFHQ, but also enable the CTFHQ to reach out beyond its own components for relevant knowledge. It must be recognized that critical knowledge will come from other government departments, agencies, and from foreign governments. Hence, the knowledge architecture must provide conditions that will support efficient interagency exchange of knowledge. The KM team should be accountable to a single member of the Command Group, namely the Chief of Staff. A possible organisational construct for KM is provided in Figure 6. This is only to indicate the important activities that the KM functional layer should be responsible for and show that it is primarily a human layer.

The following KM roles and responsibilities are proposed within the possible organizational construct:

1. Policies and Procedures
2. KM Situational Awareness (SA)
3. Direct Support
4. Plans

The functions within each of these four areas of the proposed KM team are outlined below.

Policies and Procedures Multinational Information Sharing (MNIS) - Responsibility to establish and promulgate policies & procedures related to MNIS. De-conflict national policies to ensure efficient and transparent MNIS. KM Procedures - Define and promulgate CIE procedures related to the storage and sharing of knowledge within the CTFHQ.

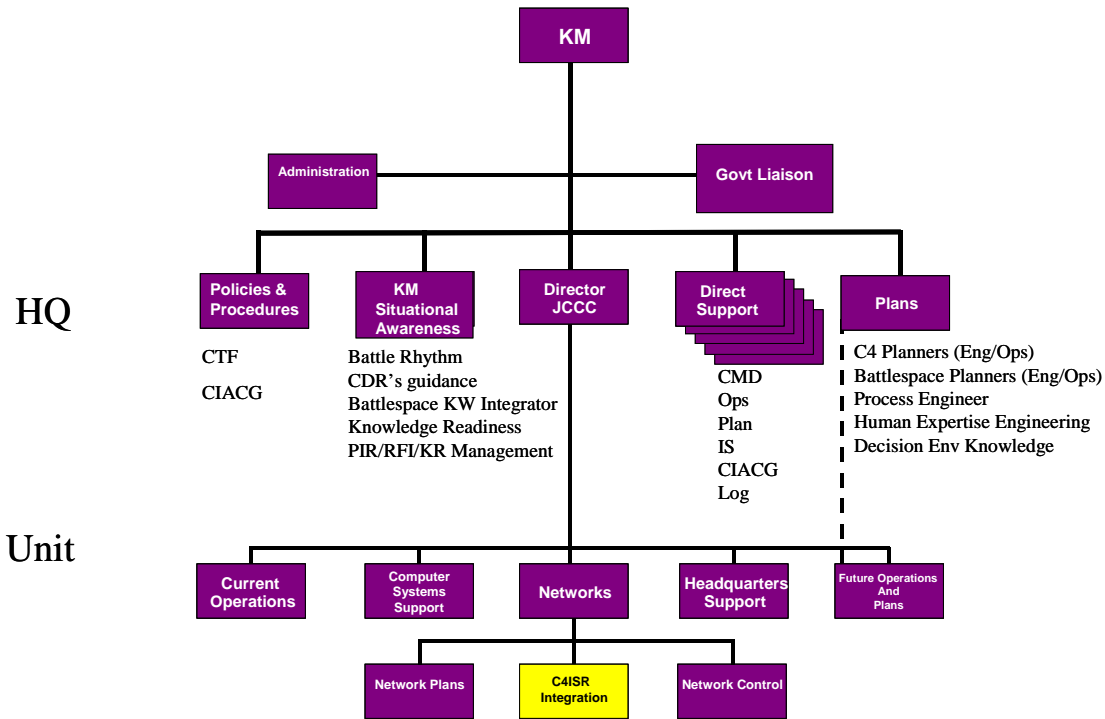


Figure 6: Possible organizational construct for KM in a CFTHQ developed by the MNE 3 KM team.

KM Situational Awareness

CTFHQ Battle Rhythm - Maintain the Battle Rhythm in accordance with the Commander's guidance. Help establish information priorities in accordance with the Battle Rhythm. PIR/RFI/KR Management - Priority Information Requests (PIR), RFI, and Knowledge Requests (KR) management for all types of information to insure that they are processed timely, are assigned a responder and a precedence, are timely responded to, and directly support the Commanders intent and support situational awareness.

Battlespace Knowledge Integrator (Ops) - Integrates all operational pictures into a single command-focused view. Functional pictures are viewed in the context of the mission.

Knowledge Readiness - Evaluates the status of the essential elements that comprises the Commander's knowledge environment and direct corrective measures. Knowledge Readiness manager monitors the following:

Plans Update: Monitors planning activities and ensures that the KM architecture will support future operational requirements.

IS Update: Monitors the IS situation and ensure that the KM architecture supports IS requirements. (Status of Intel Sources & Info Gathering)

KM Update: Monitors a number of capabilities.

- Status of communications
- Status of Battlespace sources & information related to enemy, friendly and neutral actors
- Status of Data Mining
- Status of Knowledge Training and Education
- Status of Network
- Status of Collaboration Connectivity
- Status of Data/Information Fusion & Integration

Direct Support

As it exist today for Plans, Ops, IS, CIACG. Should also be responsible to provide updates to the KM Situational Awareness group.

Plans

Decision Environment Knowledge - Builds the decision environment construct, the Who, What, Where, When and Why decisions are made and ensures KM activities and resources are synchronized with the battle rhythm.

C4 Planners (Eng/Ops) - Plans for adjustments in the systems architecture to support CTF missions. Ensures the deployment and employment of C4 systems to enable mission processes and support required decision points.

Battlespace Planners (Eng/Ops) - Plans the flow of all source information from organic assets and coalition assets. Ensures the ability of the organization to adapt to the Commander's needs for real time and near real time information.

Process Engineering - Adapts processes in accordance with Commander's intent and synchronize KM activities. Aligns CTFHQ processes to meet mission critical success factors. Human Expertise Engineering - Identifies and plans human expertise required to support missions. Provides an initial Human Expertise assessment and plan to close the differences between requirements and the assessment.

These observations reinforce the findings from the third questionnaire. The KM team clearly felt that the organization needed to be expanded and given broader roles and responsibilities. These observations also address the categories of the KM Process Requirements, Education and Training and RFI issues in the roles and responsibilities for KM.

Conclusions and Recommendations from the Experiment Analysis

In conclusion, the KM team felt that the portal structure supported the participants' requirements. They did not feel, however, that they could satisfy their colleagues' requirements and they felt that customers were requesting products that could not be provided. It was not clear if the KM team felt they received adequately defined

requirements from the other members of the headquarters. The CKIMB did not coordinate requirements from different customers or provide consolidated solutions in this experiment, as this portion of the process was not played to any significant extent. Therefore, this part of the KM process could not be analyzed.

The rest of the members of the headquarters had the following reactions on KM. Despite many positive responses, the overall perspective was that they did not feel that KM provided simple and logical access to information they needed to do their jobs. They did agree, marginally, that the KM team was proactive in identifying and satisfying their information needs. The participants indicated fairly clearly that they thought the KM process was responsive to the situation and that the KM met the requirements of the EBP process. The participants felt that KM was most valuable and effective in the early steps of the EBP process where information was being drawn from the scenario database. Finally, the point of view from all the members of both headquarters on KM revealed that Organization, Interface and KM Process Requirements were most in need of change during this experiment.

There were four recommendations from the analysis of the KM surveys. First, the KM CONOPS (KM Process and Organization in the headquarters and the CIE Business Rules) should be revised. Second, there should be more KM staff and the organization of the headquarters should be revised to ensure good integration of KMOs into the Plans, Ops and IS teams. Third, the CKIMB function should be reviewed, if necessary revised, and steps should be taken to ensure it is tested in a future event. Last, the portal interface and the document organization for each team using the portal should be revised. It may be necessary to conduct a design study and conduct separate tests or experiments on the interface technology. The observations from the KM team's meetings and the KM team's own recommendations support the analysis and provide examples for future experiments with a coalition headquarters.

Limited Objective Experiment on KM

In the period immediately after MNE 3, as nations were completing the experiment analyses and preparing "quicklook" or "after action reports", US JFCOM requested input for topics that should be addressed in the spiral development leading to MNE 4. Canada offered to lead a Knowledge Management Limited Objective Experiment (KM LOE). The other MNE 4 participating nations and NATO accepted this offer. The "Experiment" could actually include various events, ranging from seminars and workshops to research, engineering development, trials and experiments as required to examine and refine the application of KM concepts, processes, organization and technologies to properly support a Coalition Task Force in an Effects Based Operations environment.

The conceptual tasks for this LOE follow the high level objectives of Process, Organization and Technology but were developed from the findings in MNE 3. These tasks, as defined by the Experiment Directors (the military leads from each participating nations) are as follows:

1. Review the JFCOM J9 KM CONOPS and KM Concept of Employment (CONEMP) from a Coalition perspective and recommend refinements to meet Coalition KM requirements.
2. Validate the Coalition Task Force KM team role, organizational structure and KM processes and procedures.
3. Determine the proper technology to support the Coalition KM process and information displays in an optimum manner.

The deliverables from this LOE as identified by the Experiment Directors include the following items:

1. Using the abovementioned CONOPS and CONEMP as the starting point, develop Coalition KM Standard Operation procedures (SOPs) and Tactics, Techniques and Procedures (TTPs).
2. Develop the KM Plan for MNE 4.

The Canadian Forces Experimentation Centre (CFEC), host for MNE 3 and MNE 4 in Canada, conducted planning and ran internal brainstorming sessions leading up to a three day workshop (approximately three months after MNE 3) attended by a broad cross-section of defence department staff in Canada as well as representatives from US JFCOM. The findings and recommendations from this workshop were used to develop the high-level experimentation plan proposed in this paper. This plan has been prepared as part of the research for CFEC's KM LOE, but is only a proposal by the paper's authors. CFEC concept developers and experiment designers continued to progress this plan after this paper was written.

The experimentation plan is explained in terms of meeting the two deliverables. The first deliverable, the Coalition KM Standard Operation Procedures (SOPs) and Tactics, Techniques and Procedures (TTPs) should be written by a working group of military staff. This staff should be prepared by participation in a validation event, in this case an experiment, of revised KM processes and organization. The recommendations from the MNE 3 KM team are a possible example. These processes and organization should, however, be modeled and tested before an experiment through modeling and simulation or tabletop seminars with military staff. A workflow process model of the CTFHQ could be a potential starting point for a simulation study or for seminars.

The second deliverable is the KM Plan. The KM Plan uses the SOPs and the TTPs but also defines the how KM technology will be implemented in the experiment. This is driven by the activity in the experiment; the type of planning and operations the CTFHQ will be tasked to perform. The development of the MNE 4 KM technology is therefore the key activity required to complete the KM Plan.

The second deliverable should be achieved with the validation of the KM technology developed for MNE 4. The primary KM technologies should be the portal and collaboration tools for the teams in the CTFHQ. The validation of these tools, including the user interfaces, should be through a Test & Evaluation event using military subject matter experts in the planning and operations proposed for MNE 4. The design of the user interfaces should be developed by Human Factors specialists. The interfaces will

require specification of user roles and their attendant information requirements. This should be prepared with reference to the modeling work that underpins the first deliverable.

The sequence of events leading to the KM LOE is defined by the activities prescribed for the preparation of the two deliverables. The high level KM LOE experimentation plan should be achievable through the following steps:

1. Develop a workflow process model of the CTFHQ.
2. Test the design of KM in the CTFHQ through seminars or simulations.
3. Write preliminary SOPs and TTPs for KM process and organization.
4. Define user roles and their information requirements.
5. Conduct a human factors study to design the user interfaces for a portal technology.
6. Conduct a Test & Evaluation to validate the KM technologies, the user interfaces in particular.
7. Conduct an experiment or demonstration to validate KM process, organization, and technology.
8. Finalize the TTPs, SOPs, and KM Plan.

Summary

This paper discusses the experimentation associated with KM in the US JFCOM led MNE 3 event. The analysis of the survey data is presented along with the products from the deliberations of the KM team that participated in the event. While MNE 3 is considered a successful experiment, it is clear that it revealed areas for improvement in terms of knowledge management in a coalition headquarters. The findings and recommendations from MNE 3 have set the direction for the revision of KM in the CTFHQ. The paper describes a possible scenario for the revision of KM process, organization and technology that would be validated in a limited objective event. The immediate goal is a successful KM Plan for MNE 4. The ultimate goal is improved KM capabilities to support command and control in future operations.

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