A CASE STUDY: FLATTENING THE BATTLEFIELD THROUGH A C4 KNOWLEDGE MANAGEMENT SYSTEM

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Abstract. The purpose of this study is to describe the effects that a C4 (command, control, communications, and computer) knowledge management system (KMS) had on increasing the situational awareness (SA) level of network monitors maintaining a very large, dynamic, and complex communication network during wartime. This case study utilized triangulation and analysis of the multiple interviews, audiovisual material, archival records, and documents that formed the basis for the findings of this study. During Operation Iraqi Freedom (OIF), the First Marine Expeditionary Force (I MEF) G6 developed an automated Marine Air Ground Task Force Communication Control Center Event Log (MEL), a web-based KMS that replaced the physical logbook to track communication network status for this large network that supported over 86,000 personnel over four months. The MEL enhanced SA, the sharing of information directly related to the operation of the communication network, as well as the sharing of tacit and explicit knowledge of system readiness. Limitations of the study revolved around collecting data in a real battlefield situation. Considering the unusual nature of the events, the results may or may not be replicated outside of simulations until there is another major military offensive. The findings reveal the practical benefits of automating physical logbooks. The results also shed light on behaviours of individuals within a network under situations of moderate and high stress. Overall behaviours of a community of practice under wartime conditions are revealed. This case study documents behaviours in the unusual context of an invasion of enemy territory. As such this research fills the gap between theoretical considerations of knowledge management and the practical and organic implementation of a KMS.

INTRODUCTION

Situational awareness (SA) has increasingly become a keyword in the knowledge age. Military leadership must progressively be made more aware of the condition of the existing battlefield communication systems and projecting its status in the near future. The need for sustaining SA with the latest information is paramount. With the bombardment of overwhelming amounts of information, knowledge management systems have begun to find their place in a variety of contexts.

Dekker [1] discusses the trend in military and civilian communication toward internal networks and the corresponding threats to that communication infrastructure. Alberts, et al [2] define the term network centric warfare (NCW) as follows

We define NCW as an information superiority-enabled concept of operations that generates increased combat power by networking sensors, decision makers, and shooters to achieve shared awareness, increased speed of command, higher tempo of operations, greater lethality, increased survivability, and a degree of self-synchronization. In essence, NCW translates information superiority into combat power by effectively linking knowledgeable entities in the battlespace.

This demand for robust battlefield communication architectures continues to grow. Dekker [3] asserts the following

The topic of C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillance, Reconnaissance) architecture is of enduring importance for military operations.

In Freidman’s The World is flat [4], collaboration will be a hallmark of business and organizations that will increasingly deal with overwhelming amounts of information. To be successful, continued communication and common operational pictures will be needed to create accurate SA. According to Nofi [5], situational awareness (SA) is:

...the result of a dynamic process of perceiving and comprehending events in one’s environment, leading to reasonable projections as to possible ways that environment may change, and permitting predictions as to what the outcomes will be in terms of performing one’s mission. In effect, it is the development of a dynamic mental model of one’s environment.

and Lt. Gen. Paul J. Kern, Military Deputy to the Assistant Secretary of the Army for Research, Development, and Acquisition, and Lt. Gen. John N. Abrams, Deputy Commanding General, TRADOC, provided one such definition of shared SA as part of their testimony before the Senate Armed Services Committee in 1998 [5]:

Shared situational awareness...translates to a clear and accurate, common, relevant picture of the battlespace for leaders at all levels and a reduction in the potential for fratricide....The sharing of timely information enabled by digitalization improves significantly the ability of commanders and leaders to quickly make decisions, synchronize forces and fires, and increase the operational tempo.

KNOWLEDGE MANAGEMENT

In the modern information age, battle commanders are overwhelmed with the volume of data to be processed. Good decisions require systems that can manage knowledge and attribute value or context to data. Blair [6] described the need as follows:

Success on the land battlespace has traditionally been attributed to the leadership and skill of the commander. The introduction of the staff system and limitations of communications tended to isolate the commander from the sources of his information. Paradoxically, the capacity of modern communications and information systems may constrain the commander by overwhelming him with the

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