Implementing information systems with stakeholder analysis: A case study

Michael D. Myers
University of Auckland

Implementing information systems with stakeholder analysis: A case study

Michael D. Myers
University of Auckland

ABSTRACT

Despite the proliferation of information technology, the implementation of information systems remains problematic. While some organizations have been successful in implementing information systems, many systems fail to live up to expectations and some end up as disasters. This article describes how stakeholder analysis was used in the successful implementation of a decision support system in the New Zealand army. The system gives legal advice to New Zealand Army commanders about the laws of armed conflict.

INTRODUCTION

Today we are seeing the tremendous proliferation of information technology. Organizations are spending large sums of money on information technology to enhance performance, gain competitive advantage and so on. Despite this proliferation of technology, the implementation of systems remains problematic. While some organizations have been successful in implementing information systems, many systems fail to live up to expectations and some end up as disasters. As Abdel-Hamid and Madnick (1990, p. 39) point out, "We continue to produce too many project failures, marked by cost overruns, late deliveries, poor reliability, and user dissatisfaction."

In the literature on information systems implementation, two implementation strategies have been widely advocated: gain top management support and involve users in development. The implementation research, however, has found there to be a disappointing lack of consistency in the implementation results; neither approach has proved to be as successful as had been hoped (Kwon & Zmud, 1987).

This article presents a case study of how stakeholder analysis was used to implement a decision support system for the New Zealand Army. It is argued that stakeholder analysis is a broader and more comprehensive approach to IS implementation than the two more widely advocated strategies. This broader approach enabled the organization to minimize resistance to change and gain wide support for the new system.

The article proceeds as follows. The next section briefly reviews the two dominant approaches in the IS implementation field, and suggests stakeholder analysis as an alternative. The following section describes the decision support system used by the New Zealand Army. The final section discusses how stakeholder analysis was used in the successful implementation of the system.

APPROACHES TO INFORMATION SYSTEMS IMPLEMENTATION

There is now a large body of published research on information systems implementation, most of which has accumulated over the past two decades. Numerous reviews of the implementation literature have been done (Alavi & Joachimsthaler, 1992; DeLone & McLean, 1992; Dickson, 1981; Ginzberg, 1981; Ives & Olson, 1984; Keil, 1991; Kwon & Zmud, 1987; Lucas et al., 1990; Newman & Noble, 1990; Newman & Robey, 1992; Swanson, 1988), revealing that on the whole implementation studies yielded conflicting and somewhat confused findings.

While some progress has been made, about all that can be said after 20 years of research is that implementation success or failure is "generally associated" with (a) management support, (b) user involvement, and (c) conduct of the implementation process itself. "In addition, a series of studies has affirmed the importance of personal stake, goals, and problem urgency to implementation success" (Lucas, Ginzbert & Schultz, 1990, p. 34).

In view of the limited success so far, it would seem that new theories and methods of IS implementation need to be developed. This article suggests stakeholder analysis as an alternative approach to information systems implementation. While this approach might not be applicable in all situations, stakeholder analysis is a broader and more comprehensive approach to IS implementation. Building on the political analysis strategy for IS development suggested by Peter Keen (1981), stakeholder analysis assumes that support for a new system should be obtained from all of the groups that are likely to be affected by the new system, not just top management. This requires the systems developer to identify who the stakeholders are, try to determine in advance how key stakeholders might react to a new system, and decide what pre-emptive action may need to be taken to facilitate its implementation. The premise of this approach is that gaining top management support and involving users in development are necessary, but not sufficient strategies for ensuring information systems success; the stakeholder approach assumes that the developer needs to gain the support of all the stakeholders in a new system.

The following case study documents how stakeholder analysis was used in the successful implementation of a decision support system for the New Zealand Army.

THE LAWS OF ARMED CONFLICT EXPERT SYSTEM

The Laws of Armed Conflict (LOAC) Expert System is a Decision Support System which gives legal advice to New Zealand Army commanders. It has been designed to ensure the dissemination of legal knowledge pertaining to the laws of armed conflict throughout the New Zealand Army. The laws of war comprise international customary law and treaty law, in particular The Hague and Geneva Conventions.

The LOAC Expert System can be used in an advisory capacity, as a consultant, or as an aid to either the expert or an inexperienced user. The system assists the decision maker to come to a legally correct decision. This person is either a commander during military operations or students/instructors in a training environment.

The LOAC Expert System has been designed to enable the lay commander to make better, faster and more consistent decisions, and at the same time be more knowledgeable as to the laws of armed conflict pertaining to the conduct of hostilities on land.

Of course, the LOAC Expert System to date has only been used in simulated operational settings during Army field exercises. However, it is envisaged that the system could be used during the conduct of hostilities especially in the planning phase of an operation during which a commander develops his tactical course of action. The system enables the commander to anticipate and solve in advance legal problems likely to be encountered during any given operational scenario. He is thus able to conduct his operation secure in the knowledge that his operational plan is sound in terms of international law.

The LOAC Expert System was conceived and developed by Rebecca Ewert, a Major in the New Zealand Army and Legal Staff Officer for the Land Force Command. The system was developed using a product called *The Doctor and Builder,* a software product marketed by Belding Computer Services Limited, Auckland, New Zealand. This software product is used to build decision support, diagnostic and training applications and runs under DOS on IBM and IBM-compatible PCs.

System Justification

The development of a Laws of Armed Conflict Expert System was justified for many reasons. In New Zealand, the dissemination of legal knowledge throughout the armed forces was at best 'ad hoc.' Lack of resources, lack of suitably trained staff and other commitments relegated the dissemination of legal knowledge throughout the armed forces to a low priority.

However, the New Zealand Government formally ratified, on 7 February 1988, the 1977 Additional Protocols I and II to the Geneva Conventions. This re-emphasized the requirement for the New Zealand Government to disseminate legal knowledge pertaining to the laws of armed conflict throughout the armed forces. To fulfill its obligations under international law, therefore, an effective method by which to disseminate knowledge concerning the laws of armed conflict would have to be found.

Major Ewert decided to use expert system technology to effect the dissemination function for the following reasons:

- Expenditure constraints in the New Zealand Army precluded the hiring of additional legal personnel.
- A preliminary cost/benefit analysis showed that the cost of developing the LOAC Expert System would be less than one year's salary of an additional legal officer.
- Unlike one additional legal officer, the expert system could be copied many times and distributed widely throughout the organization for use simultaneously in many locations.

• A command decision made after consultation with the LOAC Expert System would ensure that all relevant rules pertaining to the laws of armed conflict were considered, whereas a person is likely to forget an important rule under stress.

Major Ewert decided to introduce the system into the New Zealand Army in the first instance, restricting its applicability to the area of law relating to determination of target legitimacy, an important aspect of the laws of armed conflict pertaining to the conduct of hostilities on land. If successful, the system could be expanded later to encode laws embodying other areas of the law relating to the conduct of hostilities on land as well as other aspects of the laws of armed conflict, including those areas of the law pertaining to sea and air forces.

STAKEHOLDER ANALYSIS

At the start of the project Major Ewert identified who would be affected by the introduction of the expert system, how such people might react, and what pre-emptive action might be taken to facilitate its implementation. Ewert believed that this approach was crucial as expert system technology had not been used in the New Zealand Army before.

Major Ewert identified three groups of people who would be directly affected by the introduction of the LOAC Expert System: commanders, students and instructors at Tactical School, and the Director of Legal Services and his legal officers.

Ewert believed that most commanders would react quite positively to the LOAC Expert System. However, some might regard the new system as an intrusion on their command "prerogative" and actively resist the system. Others, not overtly hostile to the system, might be apathetic. The latter would be just as much a threat to the successful introduction of the new system as outright hostility.

Ewert believed that most students and instructors would react positively to the LOAC Expert System. However, the instructors' active support of the system was crucial to its successful implementation.

To the extent that the Director of Legal Services perceived the LOAC Expert System as a means by which to reduce his workload, Ewert believed that his reaction to the introduction of the system would probably be positive. Other factors, however, might cause him to resist the implementation of the system. If the Director feared a loss of status and power, or if he feared that the expert system was about to replace his Directorate's primary input into the operational decision-making process, then he might feel that part of his organizational role was under threat. Although not intended to function as a replacement, the lay commanders might perceive the system as replacing legal officer involvement in the operational environment. The LOAC Expert System would permit the lay commander to make decisions without reference to a legal officer. This might lead the commander to consider the legal officer to be superfluous, which potentially could lead to conflict. The system, however, would not be designed to be a substitute for the legal officer; rather, it would simply provide a service which was not ordinarily able to be met by him.

The Director of Legal Services might also resent the fact that the system would make him lose any further opportunity to increase staff numbers and augment his "empire." The LOAC Expert System would have an impact on the number of legal officers required by the New Zealand Army. By preventing an increase in new appointments, the system could be seen as depriving the Director of Legal Services of the opportunity to expand his department.

Ewert concluded that a successful implementation strategy would need to take into account the above factors, so that pre-emptive action could be taken to exploit positive factors and neutralize or eliminate negative ones. Using a military analogy, Ewert adopted the motto, "forewarned is forearmed."

Having used stakeholder analysis to consider the likely reactions to the LOAC Expert System within the New Zealand Army, Ewert now evaluated how best to overcome resistance to change. To minimize any possible resistance to change, Major Ewert employed a number of tactics with the three affected groups: top level commitment, education and the use of change agents were some of the tactics used.

System Implementation

Top level commitment was secured early on in the project. The Commander Land Force Command agreed to sponsor the project with finance and resources so that the system could be developed to prototype level.

A prototype was developed during May-July 1989. The Legal Staff Officer at Headquarters Land Force Command, the operational headquarters of the New Zealand Army, was used as a domain expert.

Throughout the development of the prototype, the views of the Director of Legal Services on certain legal points were sought. During this early stage, the Director was interested in and "intrigued by" the concept of the LOAC Expert System.

After the prototype was completed, the system was introduced to various targeted officers "top down." The Director of Operations and Training was invited to use the system and proved to be very enthusiastic. The Director indicated that the system should be introduced into Tactical School at the earliest available opportunity, and that he would approve of the system being accorded the status of an official Army publication. He also approved the use of the system by all three New Zealand services (i.e., Navy, Army, Air Force) in an operational as well as training environment.

The system was subsequently made available for demonstration at the Military Operations and Law Conference hosted by the Commander in Chief of the United States Pacific Command on 11-14 September 1989 in Honolulu, Hawaii. Subsequently, Ewert conducted a survey of those present at the conference (from Australia, Britain, the United States, Singapore, Indonesia, Papua New Guinea and Sri Lanka). Most were enthusiastic about the product, and many attendees indicated that they would like to obtain the finished product for their own armed forces, particularly for training purposes.

In light of the positive acceptance of the product by the Director of Operations and Training in New Zealand, the system was demonstrated to a meeting of the New Zealand

Committee for the Dissemination of International Humanitarian Law held in Wellington on 5 September 1989. Attendees considered that the system was an effective method by which to disseminate the laws of armed conflict and thus an effective means by which New Zealand might discharge its obligations regarding the dissemination of such laws under international law.

CONCLUSION

The fact that there has been such limited success so far in the information systems implementation field suggests that alternatives to the existing approaches need to be considered. One such alternative is stakeholder analysis. This article has argued that stakeholder analysis is a broader and more comprehensive approach to IS implementation than some of the other, more commonly advocated strategies. The New Zealand Army case study has been used to show that stakeholder analysis is a viable alternative approach to IS implementation. Using stakeholder analysis, the implementation of the Laws of Armed Conflict Expert System within the New Zealand Army was successful. Further research is now needed to determine if stakeholder analysis would work equally well in other situations.

REFERENCES

Abdel-Hamid, T.K. & Madnick, S.E. (1990). The elusive silver lining: How we fail to learn from software development failures. *Sloan Management Review, 32*(1), 39-47.

Alavi, M. & Joachimsthaler, E.A. (1992). Revisiting DSS implementation research: A meta-analysis of the literature and suggestions for researchers. *MIS Quarterly, 16*(1), 95-113.

DeLone, W. H. & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information System Research, 3*(1), 60-95.

Dickson, G. W. (1981). Management information systems: Evolution and status. *Advances in Computers, 20*(1), 1-37.

Ginzberg, M. J. (1981). Key recurrent issues in the MIS implementation process. *MIS Quarterly, 5*(1), 47-59.

Ives, B. & Olson, M. H. (1984). User involvement and MIS success: A review of the research. *Management Science, 30*(5), 580-603.

Keil, M. (1991). *Managing MIS implementation: Identifying and removing barriers to use.* Harvard University, Unpublished Ph.D. thesis.

Keen, P.G.W. (1981). Information systems and organizational change. *Communications of the ACM, 24*(1), 24-33.

Kwon, T. H. & Zmud, R. W. (1987). Unifying the fragmented models of information systems implementation. In Boland, R. J. & Hirschheim, R. A. (Eds.). *Critical Issues in Information Systems Research*. New York: John Wiley and Sons.

Lucas, H. C. Jr., Ginzberg, M. J. & Schultz, R. L. (1990). *Information systems implementation: Testing a structural model*. Norwood: Ablex Publishing Corporation.

Newman, M. & Noble, F. (1990). User involvement as an interaction process: A case study. *Information Systems Research, 1*(1), 89-113.

Newman, M. & Robey, D. (1992). A social process model of user-analyst relationships. *MIS Quarterly, 16*(2), 249-266.

Swanson, E.B. (1988). *Information system implementation: Bridging the gap between design and utilization*. Homewood, Illinois: Richard D. Irwin, Inc.